FIG.1

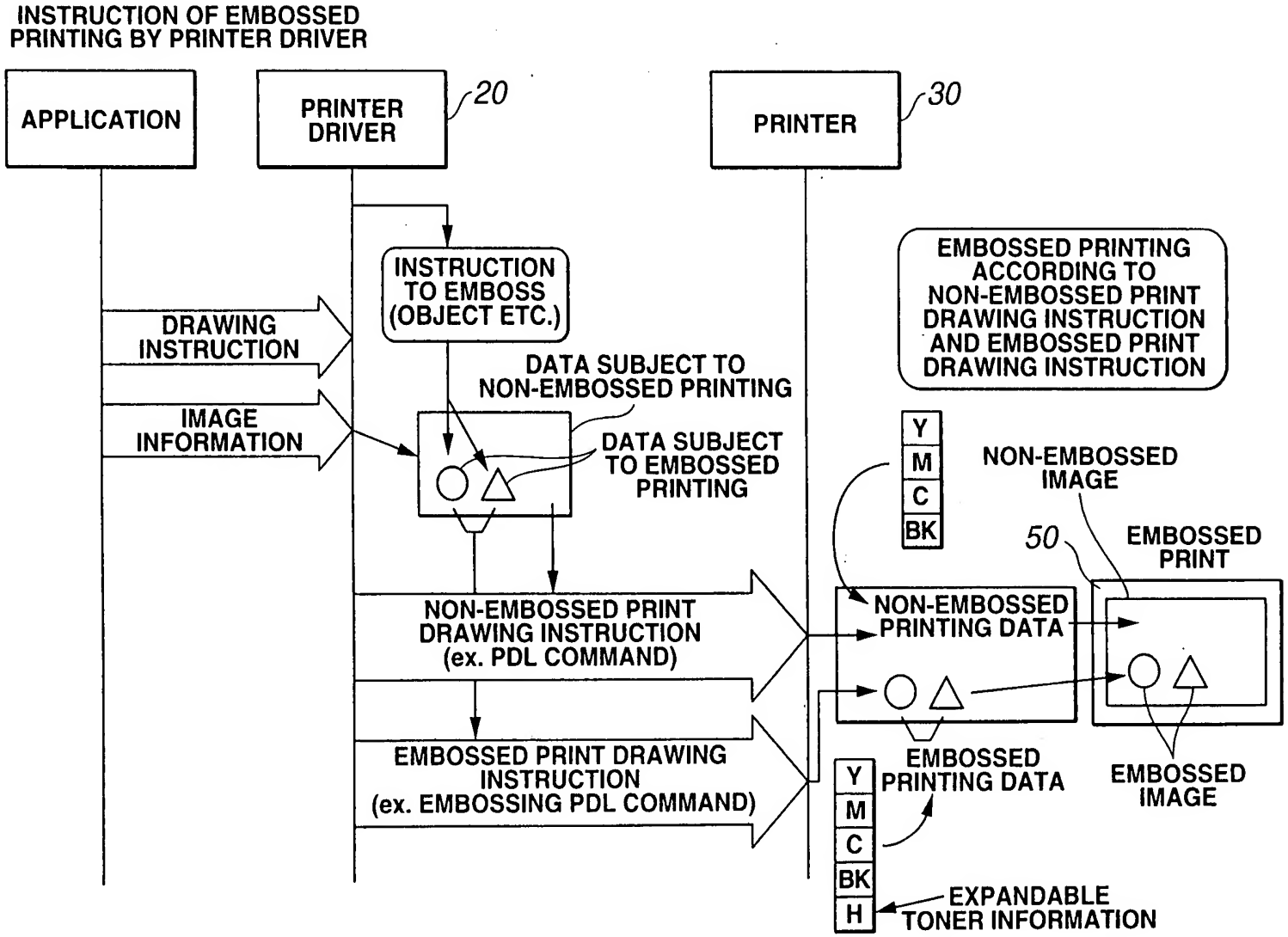
INSTRUCTION OF EMBOSSED PRINTING BY PRINTER DRIVER
APPLICATION
PRINTER DRIVER
20
PRINTER
30
INSTRUCTION TO EMBOSS (OBJECT ETC.)
EMBOSSED PRINTING ACCORDING TO NON-EMBOSSED PRINT DRAWING INSTRUCTION AND EMBOSSED PRINT DRAWING INSTRUCTION
DRAWING INSTRUCTION
IMAGE INFORMATION
DATA SUBJECT TO NON-EMBOSSED PRINTING
DATA SUBJECT TO EMBOSSED PRINTING
Y
M
C
BK
NON-EMBOSSED IMAGE
50
EMBOSSED PRINT
NON-EMBOSSED PRINT DRAWING INSTRUCTION (ex. PDL COMMAND)
NON-EMBOSSED PRINTING DATA
EMBOSSED PRINT DRAWING INSTRUCTION (ex. EMBOSSING PDL COMMAND)
EMBOSSED PRINTING DATA
EMBOSSED IMAGE
Y
M
C
BK
H
EXPANDABLE TONER INFORMATION

FIG.2

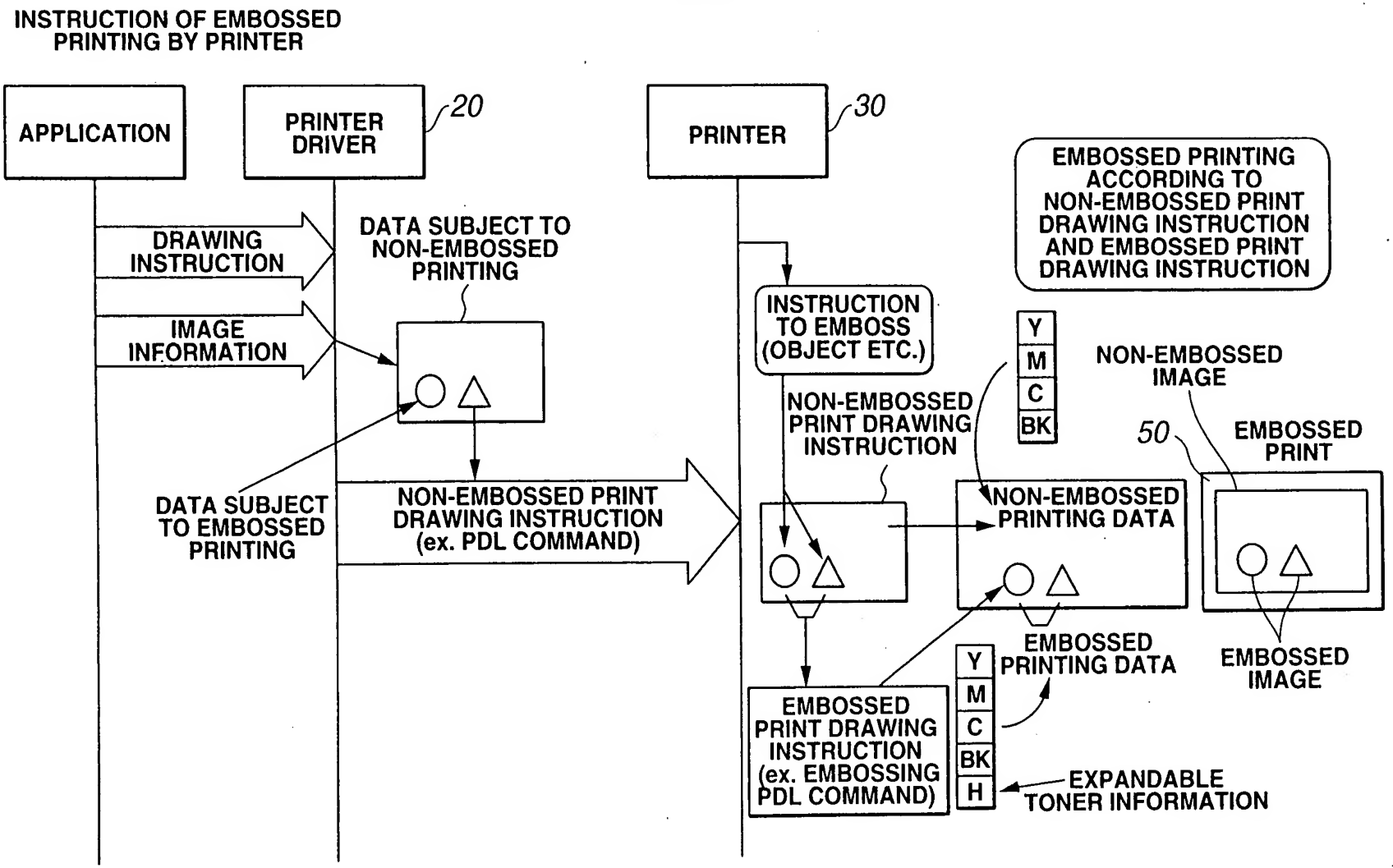
INSTRUCTION OF EMBOSSED PRINTING BY PRINTER
APPLICATION
PRINTER DRIVER
20
PRINTER
30
EMBOSSED PRINTING ACCORDING TO NON-EMBOSSED PRINT DRAWING INSTRUCTION AND EMBOSSED PRINT DRAWING INSTRUCTION
DRAWING INSTRUCTION
IMAGE INFORMATION
DATA SUBJECT TO NON-EMBOSSED PRINTING
INSTRUCTION TO EMBOSS (OBJECT ETC.)
Y
M
C
BK
NON-EMBOSSED IMAGE
NON-EMBOSSED PRINT DRAWING INSTRUCTION
50
EMBOSSED PRINT
DATA SUBJECT TO EMBOSSED PRINTING
NON-EMBOSSED PRINT DRAWING INSTRUCTION (ex. PDL COMMAND)
NON-EMBOSSED PRINTING DATA
EMBOSSED PRINTING DATA
EMBOSSED IMAGE
EMBOSSED PRINT DRAWING INSTRUCTION (ex. EMBOSSING PDL COMMAND)
Y
M
C
BK
H
EXPANDABLE TONER INFORMATION

FIG.3

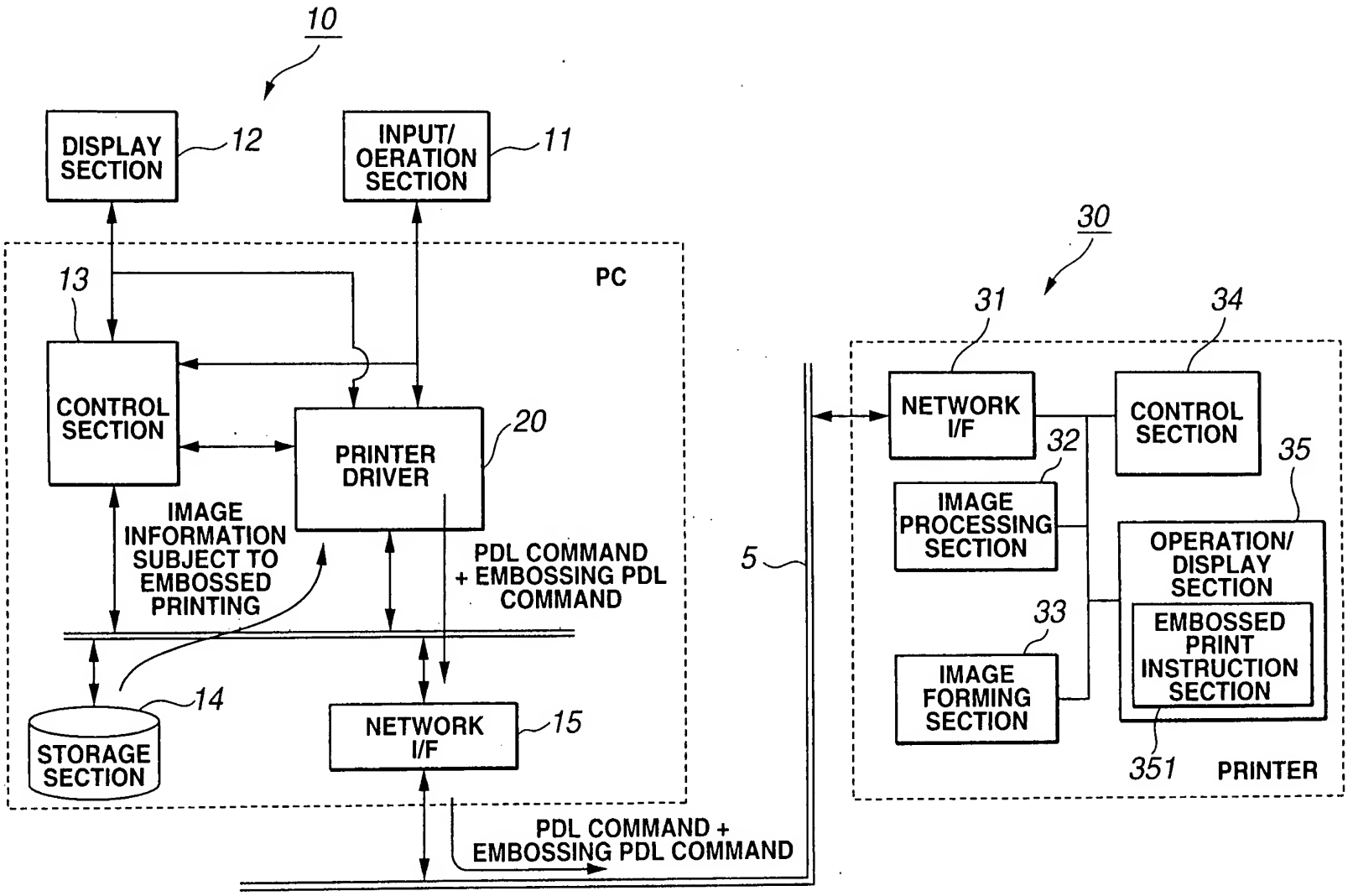
10
DISPLAY SECTION
12
INPUT/ OERATION SECTION
11
PC
13
CONTROL SECTION
PRINTER DRIVER
20
IMAGE INFORMATION SUBJECT TO EMBOSSED PRINTING
PDL COMMAND + EMBOSSING PDL COMMAND
14
STORAGE SECTION
NETWORK I/F
15
5
PDL COMMAND + EMBOSSING PDL COMMAND
30
31
NETWORK I/F
34
CONTROL SECTION
32
IMAGE PROCESSING SECTION
35
OPERATION/ DISPLAY SECTION
33
IMAGE FORMING SECTION
EMBOSSED PRINT INSTRUCTION SECTION
351
PRINTER

FIG.4

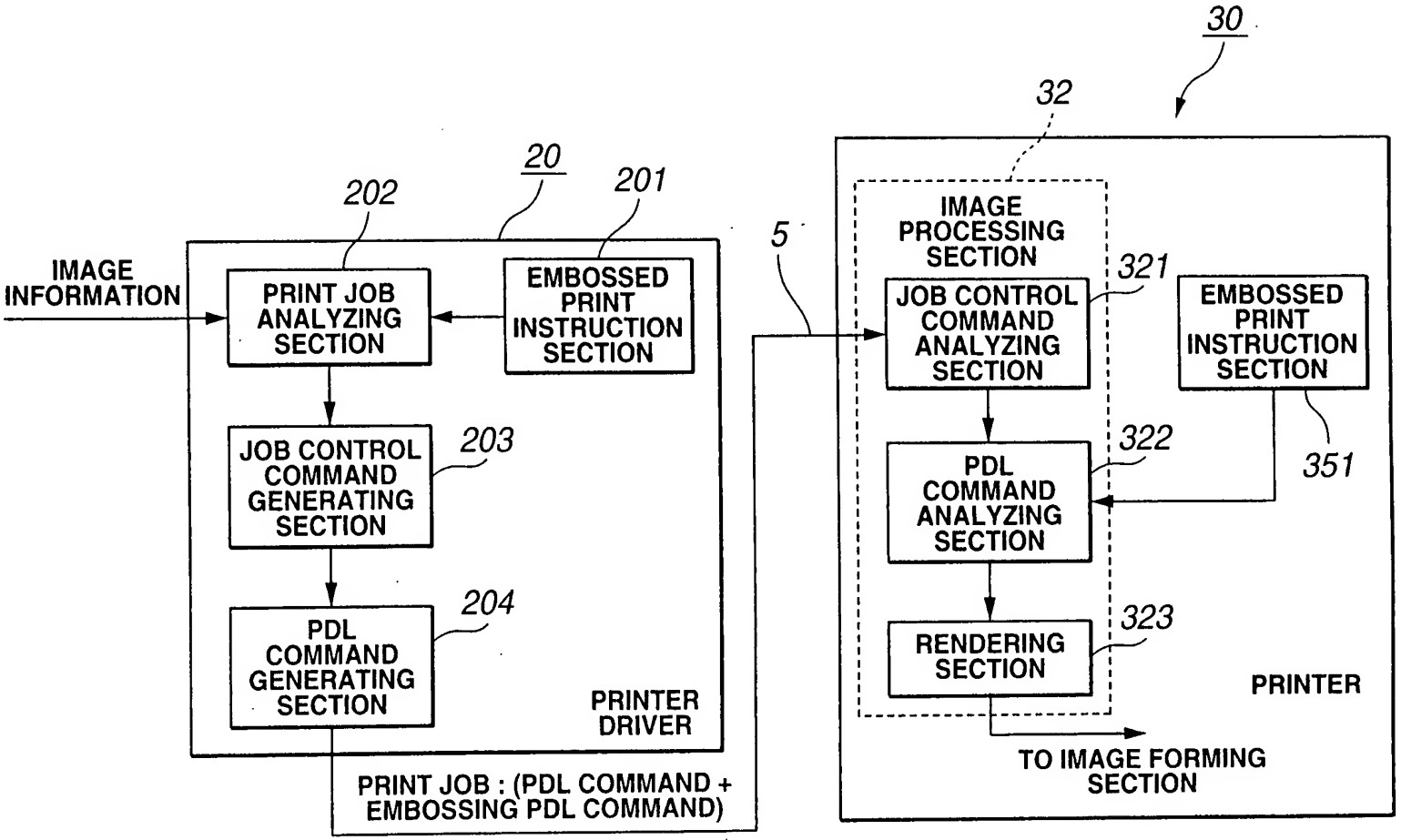
30
32
20
202
201
5
IMAGE INFORMATION
PRINT JOB ANALYZING SECTION
EMBOSSED PRINT INSTRUCTION SECTION
JOB CONTROL COMMAND GENERATING SECTION
203
PDL COMMAND GENERATING SECTION
204
PRINTER DRIVER
PRINT JOB : (PDL COMMAND + EMBOSSING PDL COMMAND)
IMAGE PROCESSING SECTION
JOB CONTROL COMMAND ANALYZING SECTION
321
EMBOSSED PRINT INSTRUCTION SECTION
322
PDL COMMAND ANALYZING SECTION
351
RENDERING SECTION
323
PRINTER
TO IMAGE FORMING SECTION

FIG.5

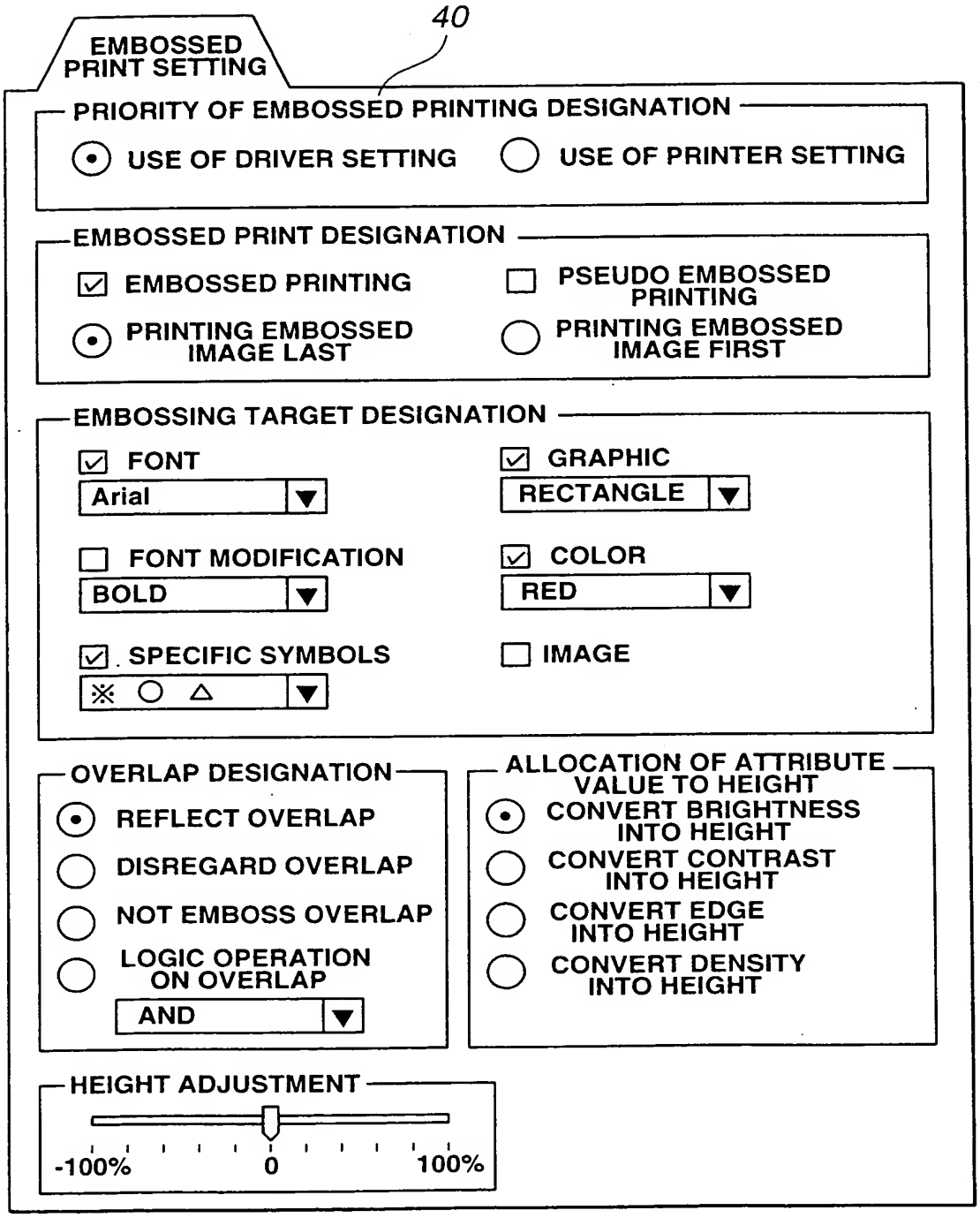
40
EMBOSSED PRINT SETTING
PRIORITY OF EMBOSSED PRINTING DESIGNATION
USE OF DRIVER SETTING
USE OF PRINTER SETTING
EMBOSSED PRINT DESIGNATION
EMBOSSED PRINTING
PSEUDO EMBOSSED PRINTING
PRINTING EMBOSSED IMAGE LAST
PRINTING EMBOSSED IMAGE FIRST
EMBOSSING TARGET DESIGNATION
FONT
Arial
GRAPHIC
RECTANGLE
FONT MODIFICATION
BOLD
COLOR
RED
SPECIFIC SYMBOLS
※ ○ △
IMAGE
OVERLAP DESIGNATION
REFLECT OVERLAP
DISREGARD OVERLAP
NOT EMBOSS OVERLAP
LOGIC OPERATION ON OVERLAP
AND
ALLOCATION OF ATTRIBUTE VALUE TO HEIGHT
CONVERT BRIGHTNESS INTO HEIGHT
CONVERT CONTRAST INTO HEIGHT
CONVERT EDGE INTO HEIGHT
CONVERT DENSITY INTO HEIGHT
HEIGHT ADJUSTMENT
-100%
0
100%

FIG.6

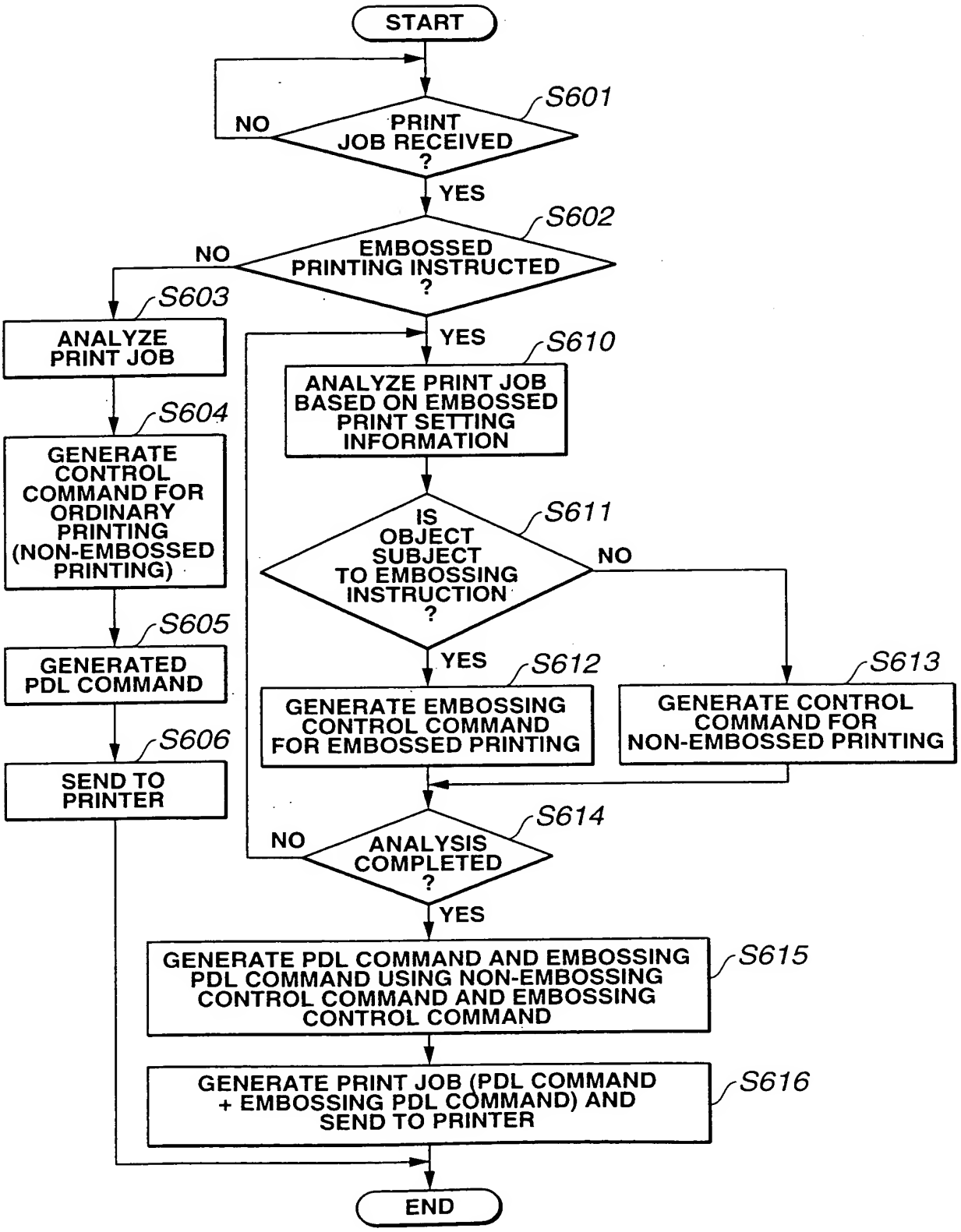
START
S601
PRINT JOB RECEIVED ?
NO
YES
S602
EMBOSSED PRINTING INSTRUCTED ?
NO
YES
S603
ANALYZE PRINT JOB
S604
GENERATE CONTROL COMMAND FOR ORDINARY PRINTING (NON-EMBOSSED PRINTING)
S605
GENERATED PDL COMMAND
S606
SEND TO PRINTER
S610
ANALYZE PRINT JOB BASED ON EMBOSSED PRINT SETTING INFORMATION
S611
IS OBJECT SUBJECT TO EMBOSSING INSTRUCTION ?
NO
YES
S612
GENERATE EMBOSSING CONTROL COMMAND FOR EMBOSSED PRINTING
S613
GENERATE CONTROL COMMAND FOR NON-EMBOSSED PRINTING
S614
ANALYSIS COMPLETED ?
NO
YES
S615
GENERATE PDL COMMAND AND EMBOSSING PDL COMMAND USING NON-EMBOSSING CONTROL COMMAND AND EMBOSSING CONTROL COMMAND
S616
GENERATE PRINT JOB (PDL COMMAND + EMBOSSING PDL COMMAND) AND SEND TO PRINTER
END

FIG.7

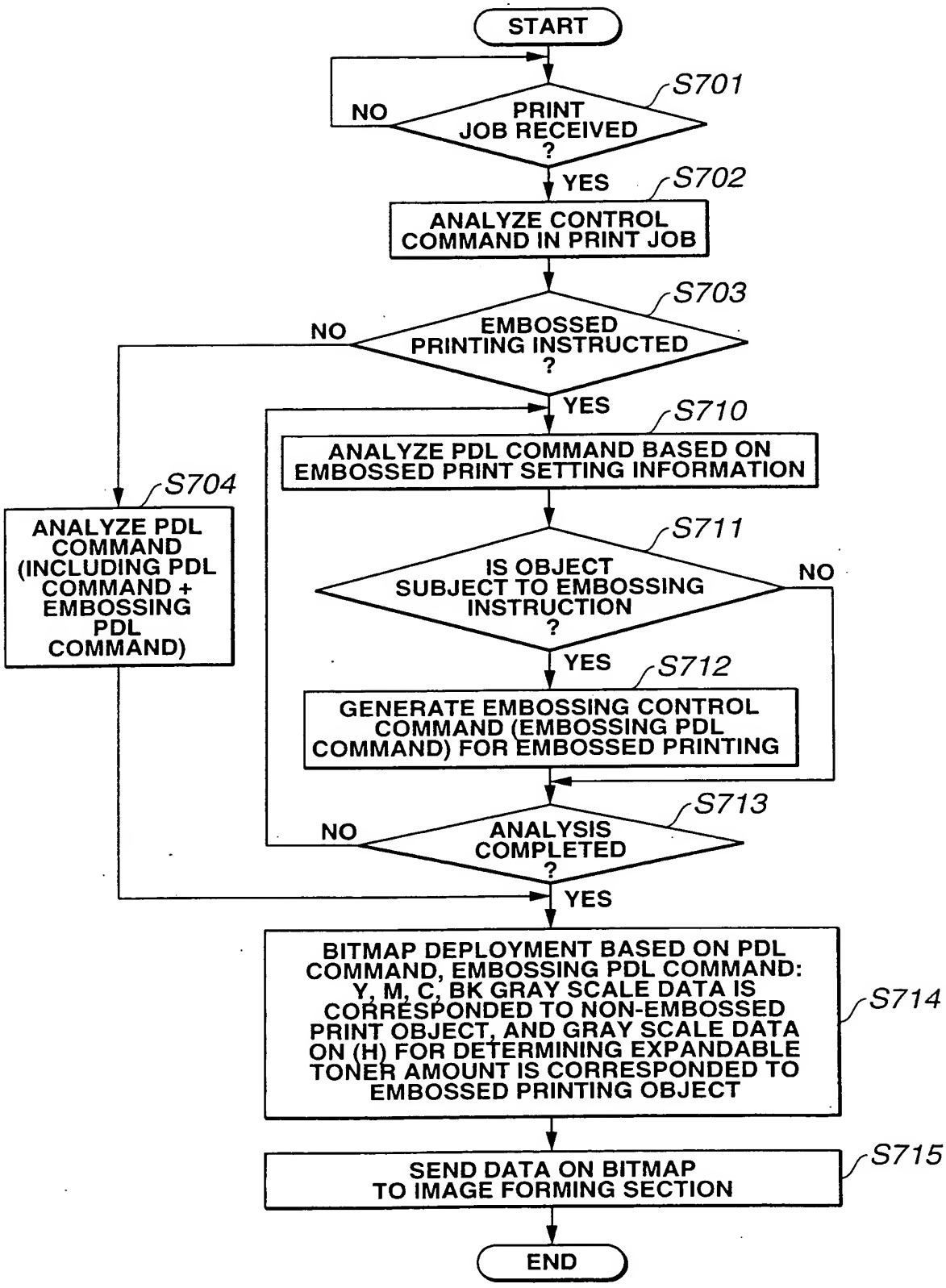
START
S701
PRINT JOB RECEIVED ?
NO
YES
S702
ANALYZE CONTROL COMMAND IN PRINT JOB
S703
EMBOSSED PRINTING INSTRUCTED ?
NO
YES
S704
ANALYZE PDL COMMAND (INCLUDING PDL COMMAND + EMBOSSING PDL COMMAND)
S710
ANALYZE PDL COMMAND BASED ON EMBOSSED PRINT SETTING INFORMATION
S711
IS OBJECT SUBJECT TO EMBOSSING INSTRUCTION ?
NO
YES
S712
GENERATE EMBOSSING CONTROL COMMAND (EMBOSSING PDL COMMAND) FOR EMBOSSED PRINTING
S713
ANALYSIS COMPLETED ?
NO
YES
BITMAP DEPLOYMENT BASED ON PDL COMMAND, EMBOSSING PDL COMMAND: Y, M, C, BK GRAY SCALE DATA IS CORRESPONDED TO NON-EMBOSSED PRINT OBJECT, AND GRAY SCALE DATA ON (H) FOR DETERMINING EXPANDABLE TONER AMOUNT IS CORRESPONDED TO EMBOSSED PRINTING OBJECT
S714
SEND DATA ON BITMAP TO IMAGE FORMING SECTION
S715
END

FIG.8A TRANSFER STEP (Y)

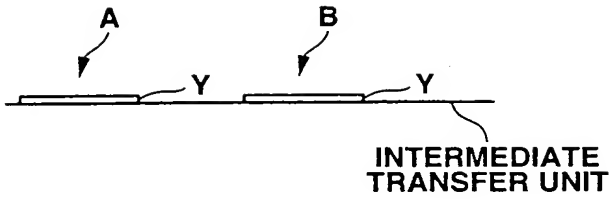

FIG.8B TRANSFER STEP (M)

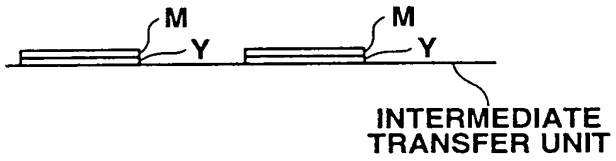

FIG.8C TRANSFER STEP (C)

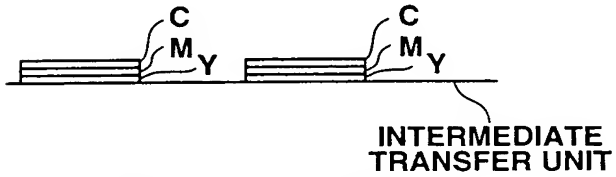

FIG.8D TRANSFER STEP (K)

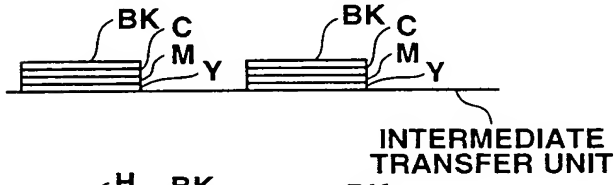

FIG.8E TRANSFER STEP (H)

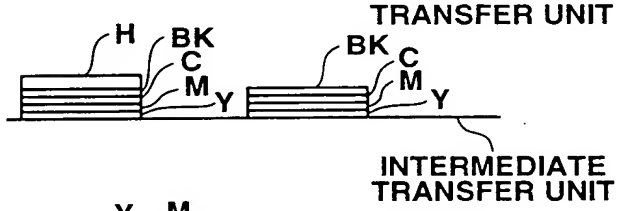

FIG.8F SECONDARY TRANSFER STEP

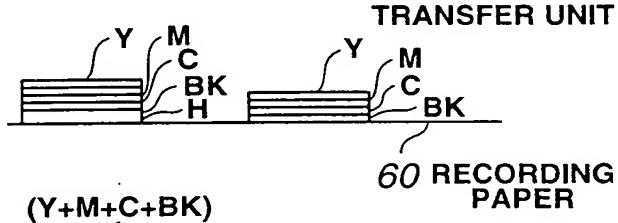

FIG.8G FIXING STEP

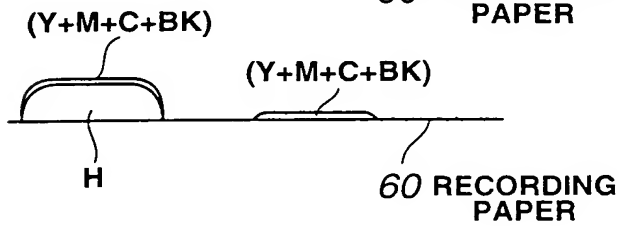

FIG.9A

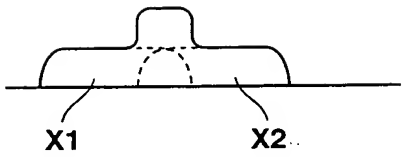

FIG.9B

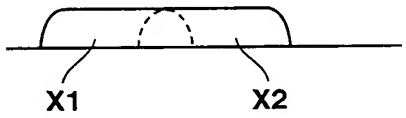

FIG.9C

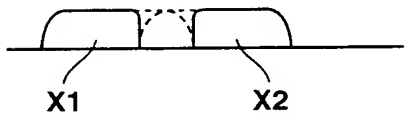

FIG.9D

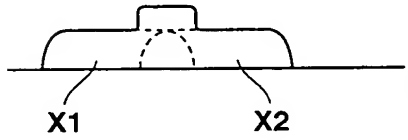

FIG.10

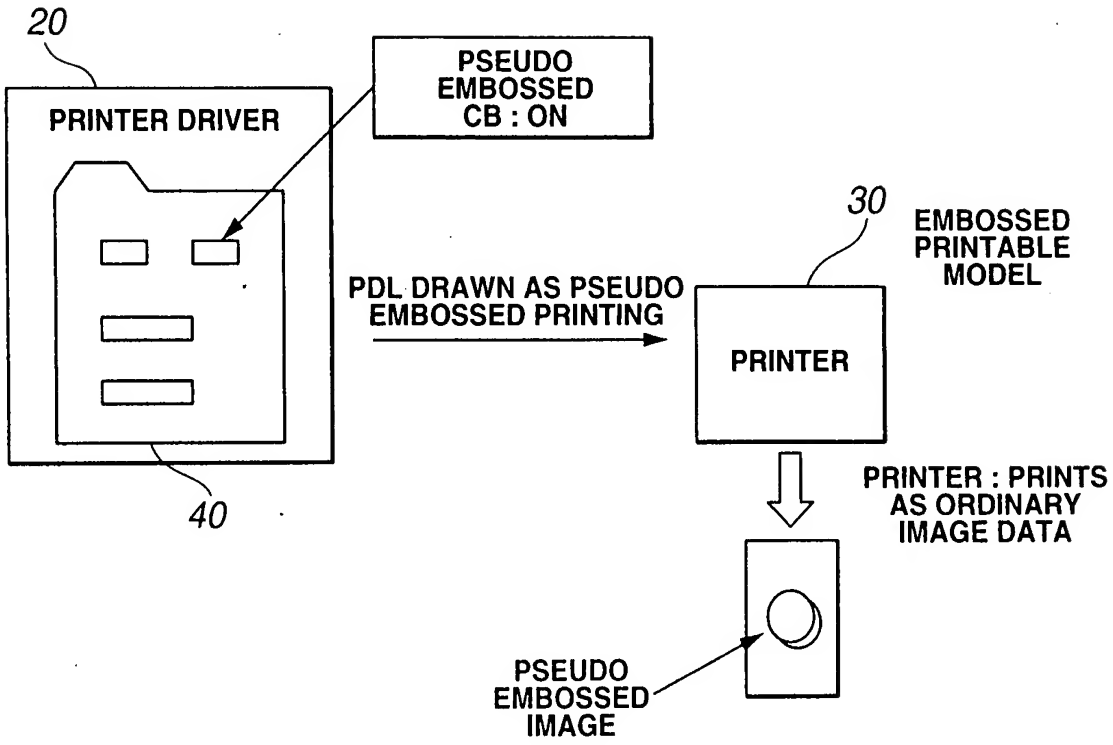
20
PRINTER DRIVER
PSEUDO
EMBOSSED
CB : ON
40
PDL DRAWN AS PSEUDO
EMBOSSED PRINTING
30
EMBOSSED
PRINTABLE
MODEL
PRINTER
PRINTER : PRINTS
AS ORDINARY
IMAGE DATA
PSEUDO
EMBOSSED
IMAGE

FIG.11A

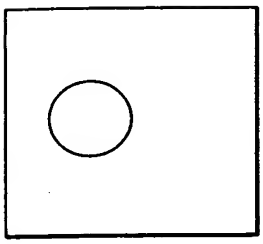

FIG.11B

DISPLACEMENT IN PRESCRIBED DIRECTION

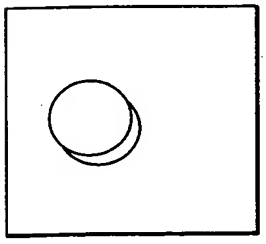

FIG.11C

ENHANCEMENT OF CONTOUR

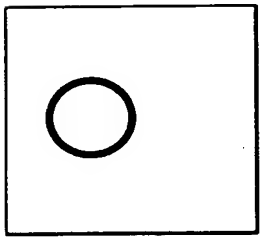

FIG.11D

INDICATION OF SHADOW ON THE PERIPHERY BY GRADATION

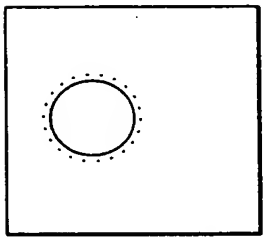

FIG.12

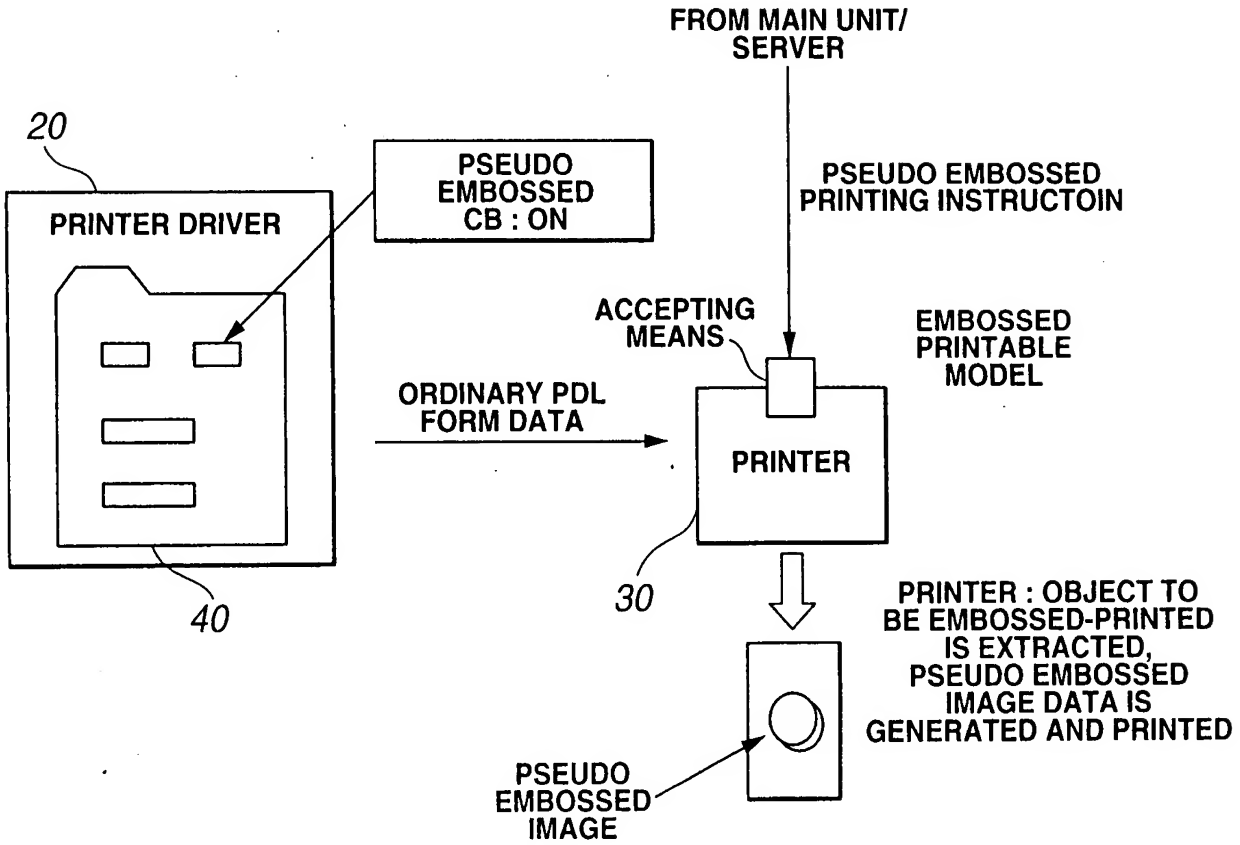
FROM MAIN UNIT/
SERVER
20
PSEUDO
EMBOSSED
CB : ON
PSEUDO EMBOSSED
PRINTING INSTRUCTOIN
PRINTER DRIVER
ACCEPTING
MEANS
EMBOSSED
PRINTABLE
MODEL
ORDINARY PDL
FORM DATA
PRINTER
40
30
PRINTER : OBJECT TO
BE EMBOSSED-PRINTED
IS EXTRACTED,
PSEUDO EMBOSSED
IMAGE DATA IS
GENERATED AND PRINTED
PSEUDO
EMBOSSED
IMAGE

FIG.13

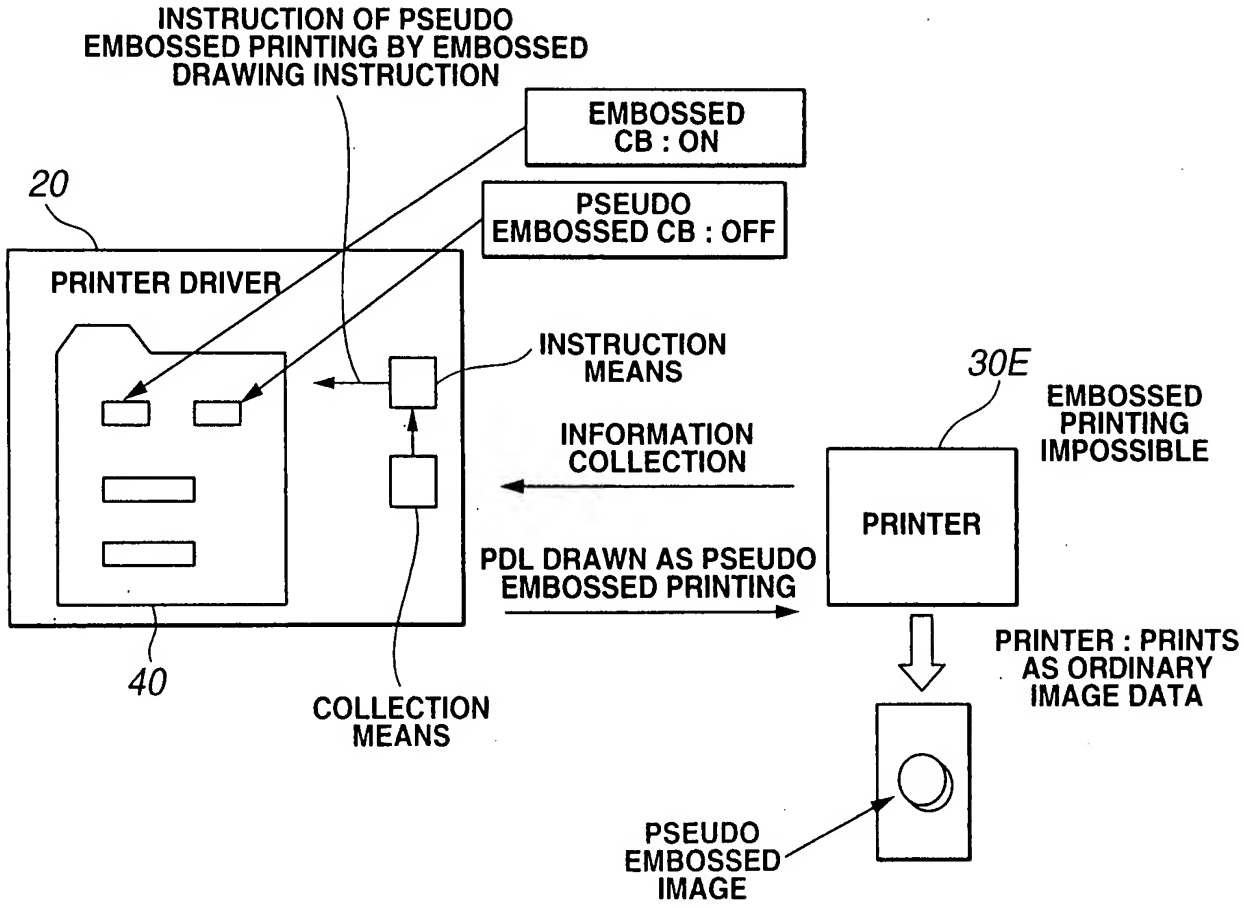
INSTRUCTION OF PSEUDO EMBOSSED PRINTING BY EMBOSSED DRAWING INSTRUCTION
EMBOSSED CB : ON
PSEUDO EMBOSSED CB : OFF
20
PRINTER DRIVER
INSTRUCTION MEANS
INFORMATION COLLECTION
PDL DRAWN AS PSEUDO EMBOSSED PRINTING
30E
EMBOSSED PRINTING IMPOSSIBLE
PRINTER
PRINTER : PRINTS AS ORDINARY IMAGE DATA
40
COLLECTION MEANS
PSEUDO EMBOSSED IMAGE

FIG.14

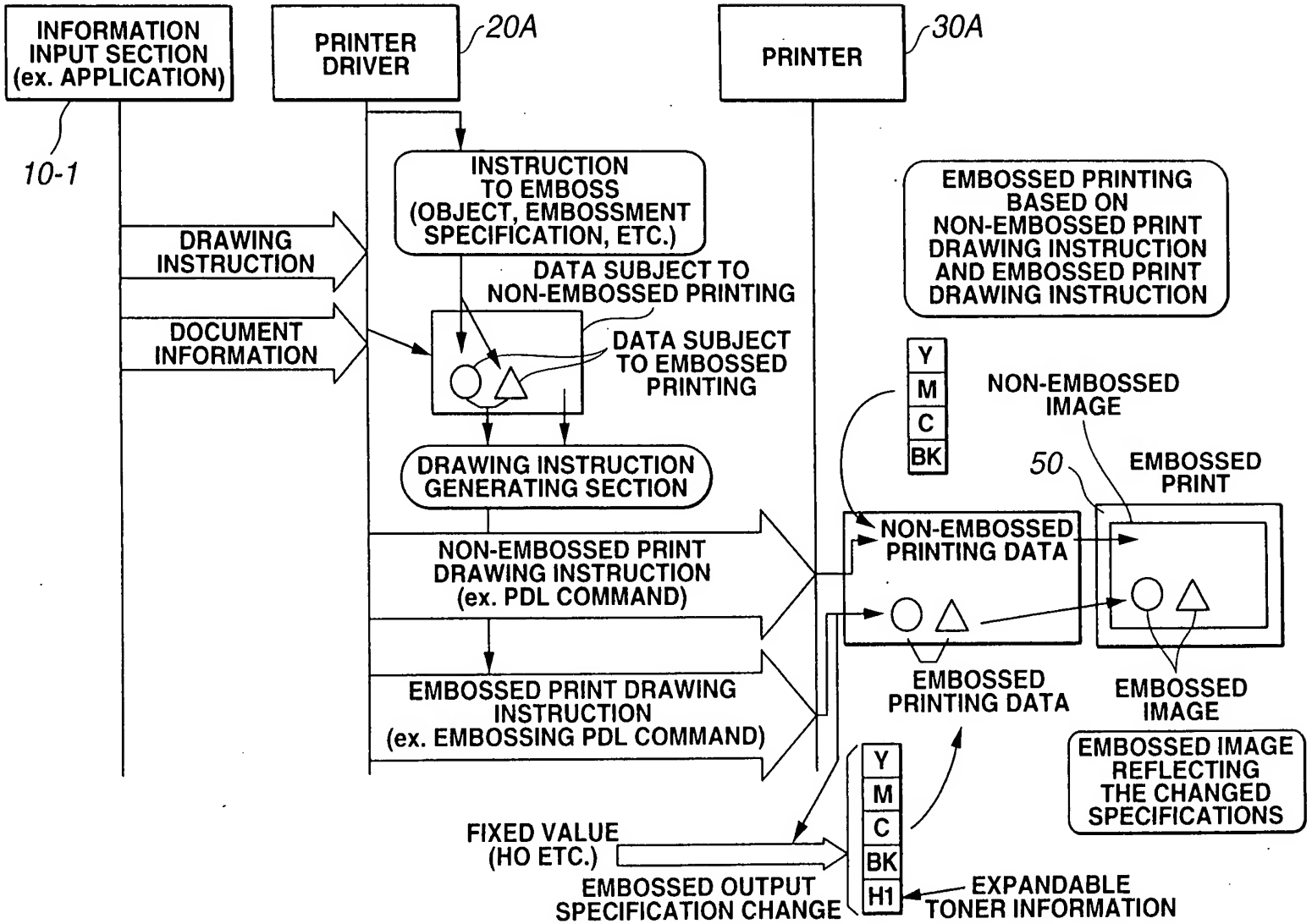
INFORMATION INPUT SECTION (ex. APPLICATION)
10-1
PRINTER DRIVER
20A
PRINTER
30A
INSTRUCTION TO EMBOSS (OBJECT, EMBOSSMENT SPECIFICATION, ETC.)
DRAWING INSTRUCTION
DOCUMENT INFORMATION
DATA SUBJECT TO NON-EMBOSSED PRINTING
DATA SUBJECT TO EMBOSSED PRINTING
DRAWING INSTRUCTION GENERATING SECTION
NON-EMBOSSED PRINT DRAWING INSTRUCTION (ex. PDL COMMAND)
EMBOSSED PRINT DRAWING INSTRUCTION (ex. EMBOSSING PDL COMMAND)
EMBOSSED PRINTING BASED ON NON-EMBOSSED PRINT DRAWING INSTRUCTION AND EMBOSSED PRINT DRAWING INSTRUCTION
Y
M
C
BK
NON-EMBOSSED IMAGE
50
EMBOSSED PRINT
NON-EMBOSSED PRINTING DATA
EMBOSSED PRINTING DATA
EMBOSSED IMAGE
EMBOSSED IMAGE REFLECTING THE CHANGED SPECIFICATIONS
FIXED VALUE (HO ETC.)
EMBOSSED OUTPUT SPECIFICATION CHANGE
Y
M
C
BK
H1
EXPANDABLE TONER INFORMATION

FIG.15

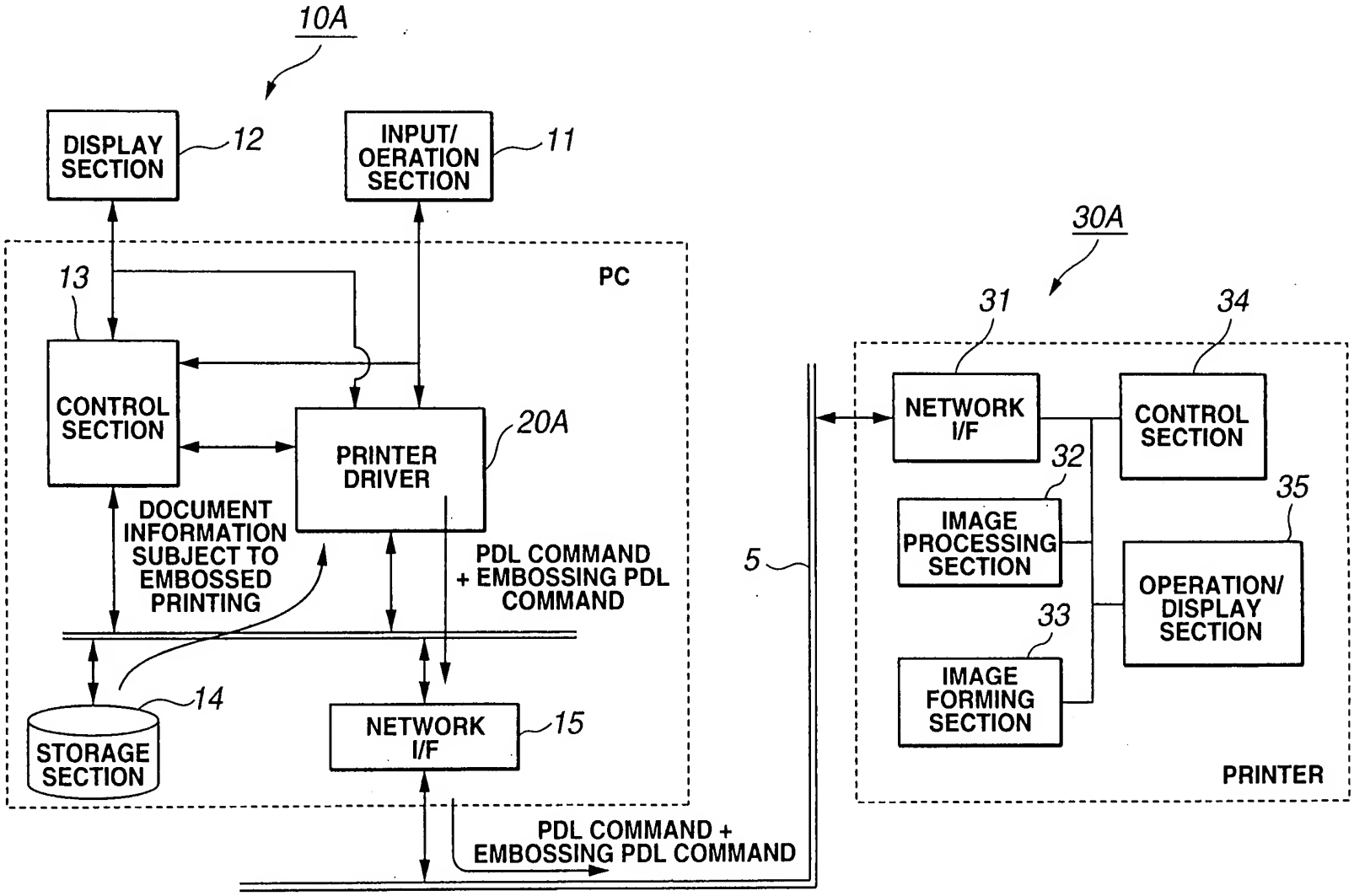
10A
DISPLAY SECTION
12
INPUT/ OERATION SECTION
11
PC
13
CONTROL SECTION
PRINTER DRIVER
20A
DOCUMENT INFORMATION SUBJECT TO EMBOSSED PRINTING
PDL COMMAND + EMBOSSING PDL COMMAND
14
STORAGE SECTION
NETWORK I/F
15
PDL COMMAND + EMBOSSING PDL COMMAND
5
30A
31
NETWORK I/F
34
CONTROL SECTION
32
IMAGE PROCESSING SECTION
35
OPERATION/ DISPLAY SECTION
33
IMAGE FORMING SECTION
PRINTER

FIG.16

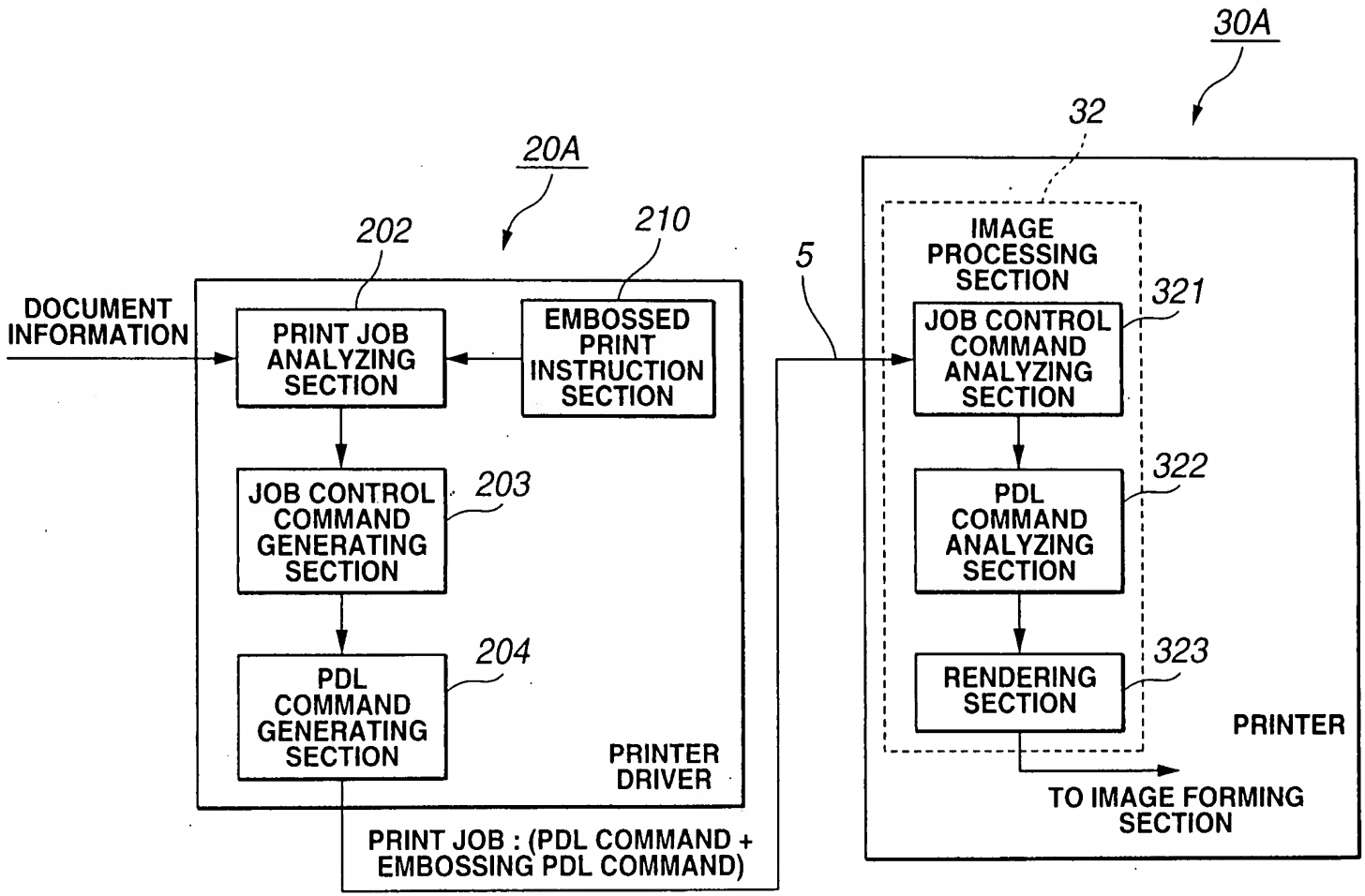
30A
32
20A
202
210
5
IMAGE PROCESSING SECTION
DOCUMENT INFORMATION
PRINT JOB ANALYZING SECTION
EMBOSSED PRINT INSTRUCTION SECTION
JOB CONTROL COMMAND ANALYZING SECTION
321
JOB CONTROL COMMAND GENERATING SECTION
203
PDL COMMAND ANALYZING SECTION
322
PDL COMMAND GENERATING SECTION
204
RENDERING SECTION
323
PRINTER DRIVER
PRINTER
TO IMAGE FORMING SECTION
PRINT JOB : (PDL COMMAND + EMBOSSING PDL COMMAND)

FIG.17

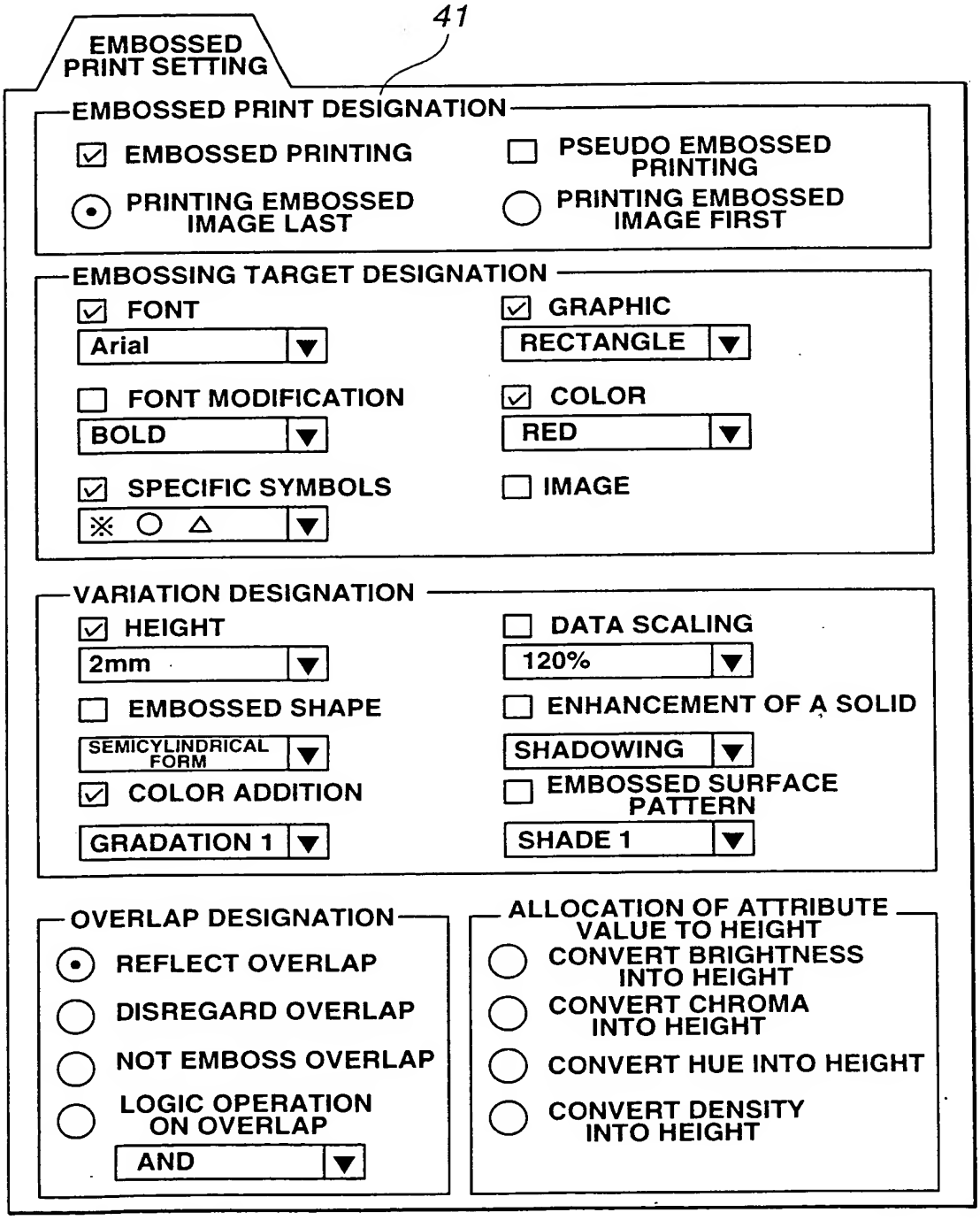
41
EMBOSSED PRINT SETTING
EMBOSSED PRINT DESIGNATION
EMBOSSED PRINTING
PSEUDO EMBOSSED PRINTING
PRINTING EMBOSSED IMAGE LAST
PRINTING EMBOSSED IMAGE FIRST
EMBOSSING TARGET DESIGNATION
FONT
Arial
GRAPHIC
RECTANGLE
FONT MODIFICATION
BOLD
COLOR
RED
SPECIFIC SYMBOLS
※ ○ △
IMAGE
VARIATION DESIGNATION
HEIGHT
2mm
DATA SCALING
120%
EMBOSSED SHAPE
SEMICYLINDRICAL FORM
ENHANCEMENT OF A SOLID
SHADOWING
COLOR ADDITION
GRADATION 1
EMBOSSED SURFACE PATTERN
SHADE 1
OVERLAP DESIGNATION
REFLECT OVERLAP
DISREGARD OVERLAP
NOT EMBOSS OVERLAP
LOGIC OPERATION ON OVERLAP
AND
ALLOCATION OF ATTRIBUTE VALUE TO HEIGHT
CONVERT BRIGHTNESS INTO HEIGHT
CONVERT CHROMA INTO HEIGHT
CONVERT HUE INTO HEIGHT
CONVERT DENSITY INTO HEIGHT

FIG.18

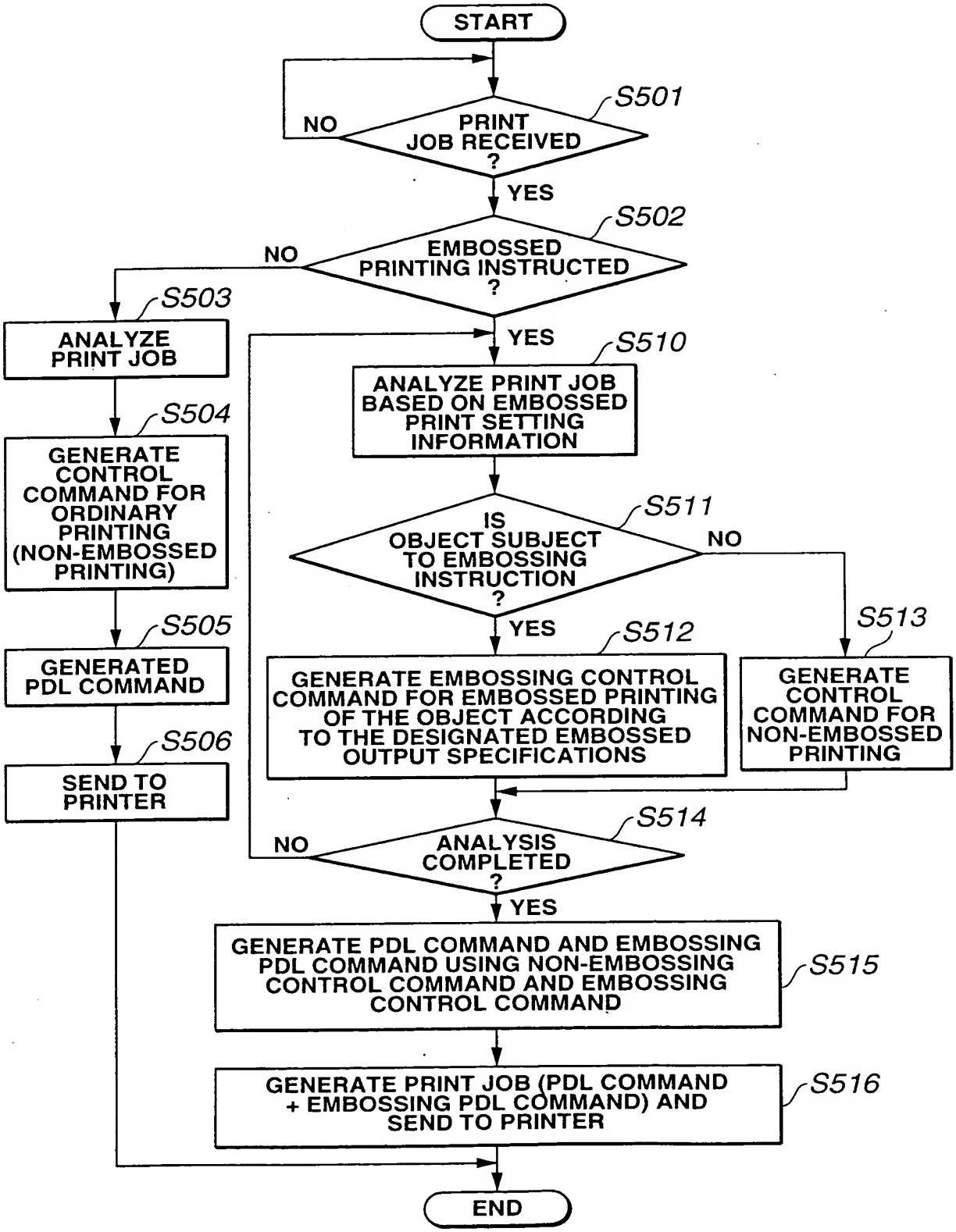
START
S501
PRINT JOB RECEIVED ?
NO
YES
S502
EMBOSSED PRINTING INSTRUCTED ?
NO
YES
S503
ANALYZE PRINT JOB
S504
GENERATE CONTROL COMMAND FOR ORDINARY PRINTING (NON-EMBOSSED PRINTING)
S505
GENERATED PDL COMMAND
S506
SEND TO PRINTER
S510
ANALYZE PRINT JOB BASED ON EMBOSSED PRINT SETTING INFORMATION
S511
IS OBJECT SUBJECT TO EMBOSSING INSTRUCTION ?
NO
YES
S512
GENERATE EMBOSSING CONTROL COMMAND FOR EMBOSSED PRINTING OF THE OBJECT ACCORDING TO THE DESIGNATED EMBOSSED OUTPUT SPECIFICATIONS
S513
GENERATE CONTROL COMMAND FOR NON-EMBOSSED PRINTING
S514
ANALYSIS COMPLETED ?
NO
YES
S515
GENERATE PDL COMMAND AND EMBOSSING PDL COMMAND USING NON-EMBOSSING CONTROL COMMAND AND EMBOSSING CONTROL COMMAND
S516
GENERATE PRINT JOB (PDL COMMAND + EMBOSSING PDL COMMAND) AND SEND TO PRINTER
END

FIG.19

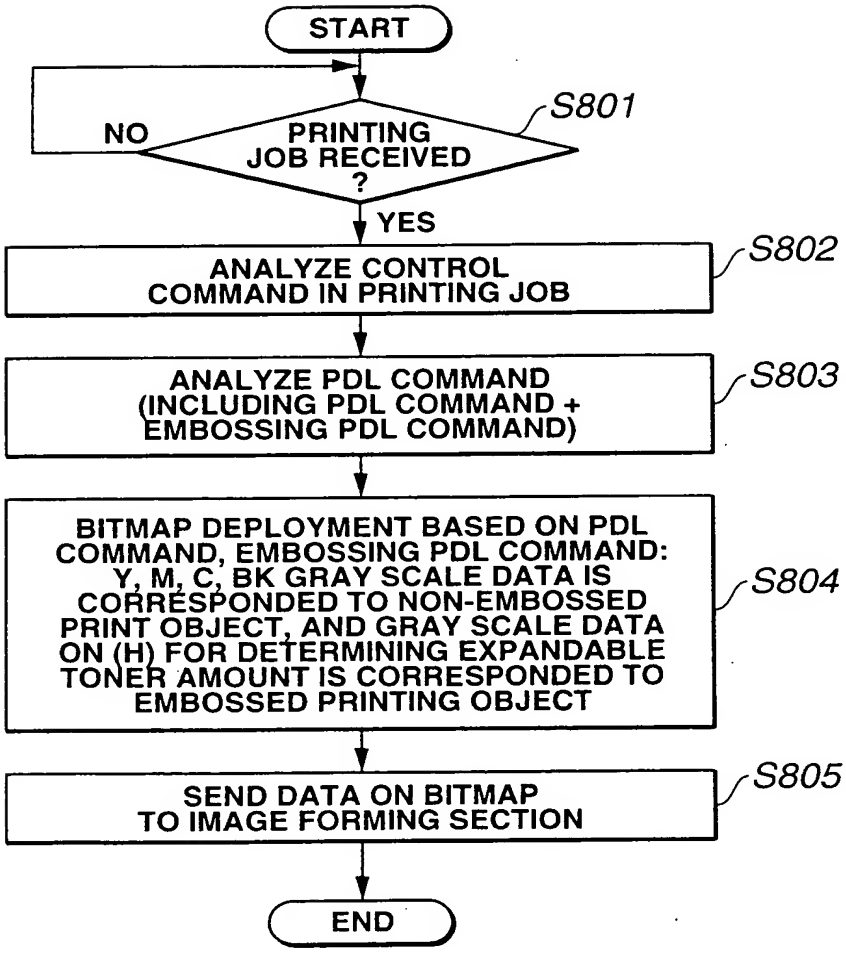
START
S801
NO
PRINTING JOB RECEIVED ?
YES
ANALYZE CONTROL COMMAND IN PRINTING JOB
S802
ANALYZE PDL COMMAND (INCLUDING PDL COMMAND + EMBOSSING PDL COMMAND)
S803
BITMAP DEPLOYMENT BASED ON PDL COMMAND, EMBOSSING PDL COMMAND: Y, M, C, BK GRAY SCALE DATA IS CORRESPONDED TO NON-EMBOSSED PRINT OBJECT, AND GRAY SCALE DATA ON (H) FOR DETERMINING EXPANDABLE TONER AMOUNT IS CORRESPONDED TO EMBOSSED PRINTING OBJECT
S804
SEND DATA ON BITMAP TO IMAGE FORMING SECTION
S805
END

FIG.20

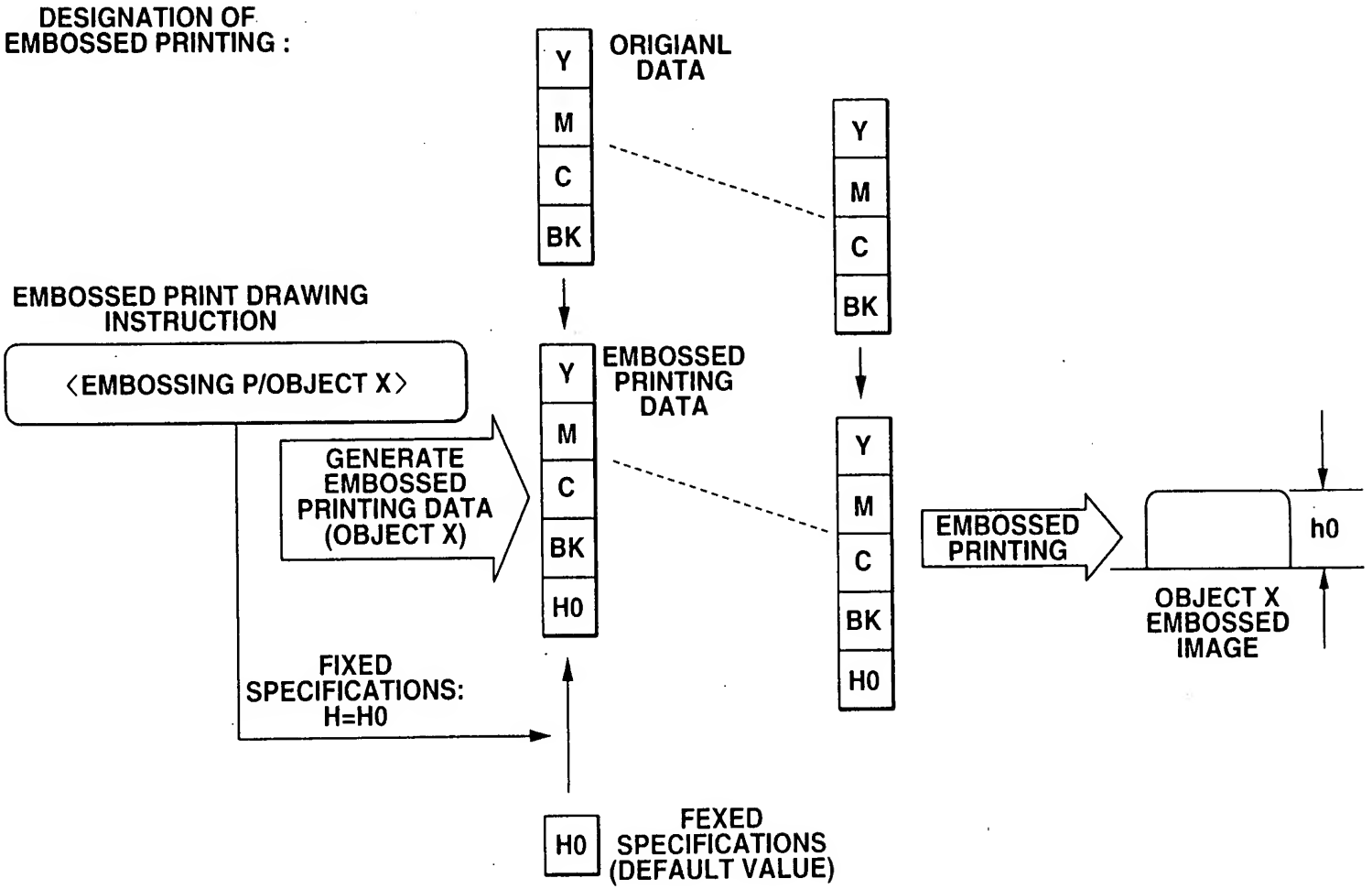
DESIGNATION OF EMBOSSED PRINTING :
Y
M
C
BK
ORIGIANL DATA
Y
M
C
BK
EMBOSSED PRINT DRAWING INSTRUCTION
〈EMBOSSING P/OBJECT X〉
Y
M
C
BK
H0
EMBOSSED PRINTING DATA
GENERATE EMBOSSED PRINTING DATA (OBJECT X)
Y
M
C
BK
H0
EMBOSSED PRINTING
h0
OBJECT X EMBOSSED IMAGE
FIXED SPECIFICATIONS: H=H0
H0
FEXED SPECIFICATIONS (DEFAULT VALUE)

FIG.21

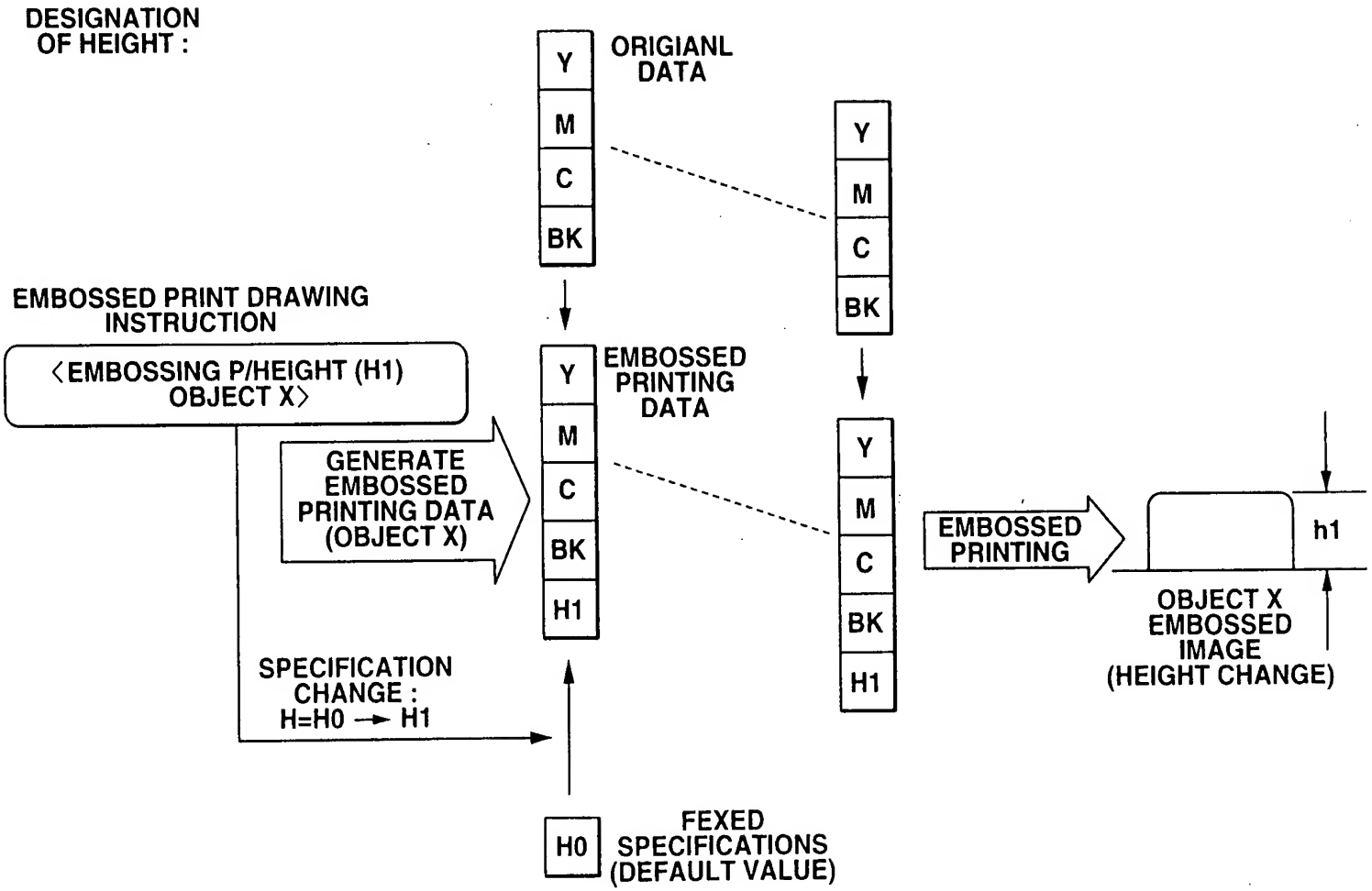
DESIGNATION OF HEIGHT :
Y
M
C
BK
ORIGIANL DATA
Y
M
C
BK
EMBOSSED PRINT DRAWING INSTRUCTION
〈EMBOSSING P/HEIGHT (H1) OBJECT X〉
GENERATE EMBOSSED PRINTING DATA (OBJECT X)
Y
M
C
BK
H1
EMBOSSED PRINTING DATA
Y
M
C
BK
H1
EMBOSSED PRINTING
h1
OBJECT X EMBOSSED IMAGE (HEIGHT CHANGE)
SPECIFICATION CHANGE : H=H0 → H1
H0
FEXED SPECIFICATIONS (DEFAULT VALUE)

FIG.22

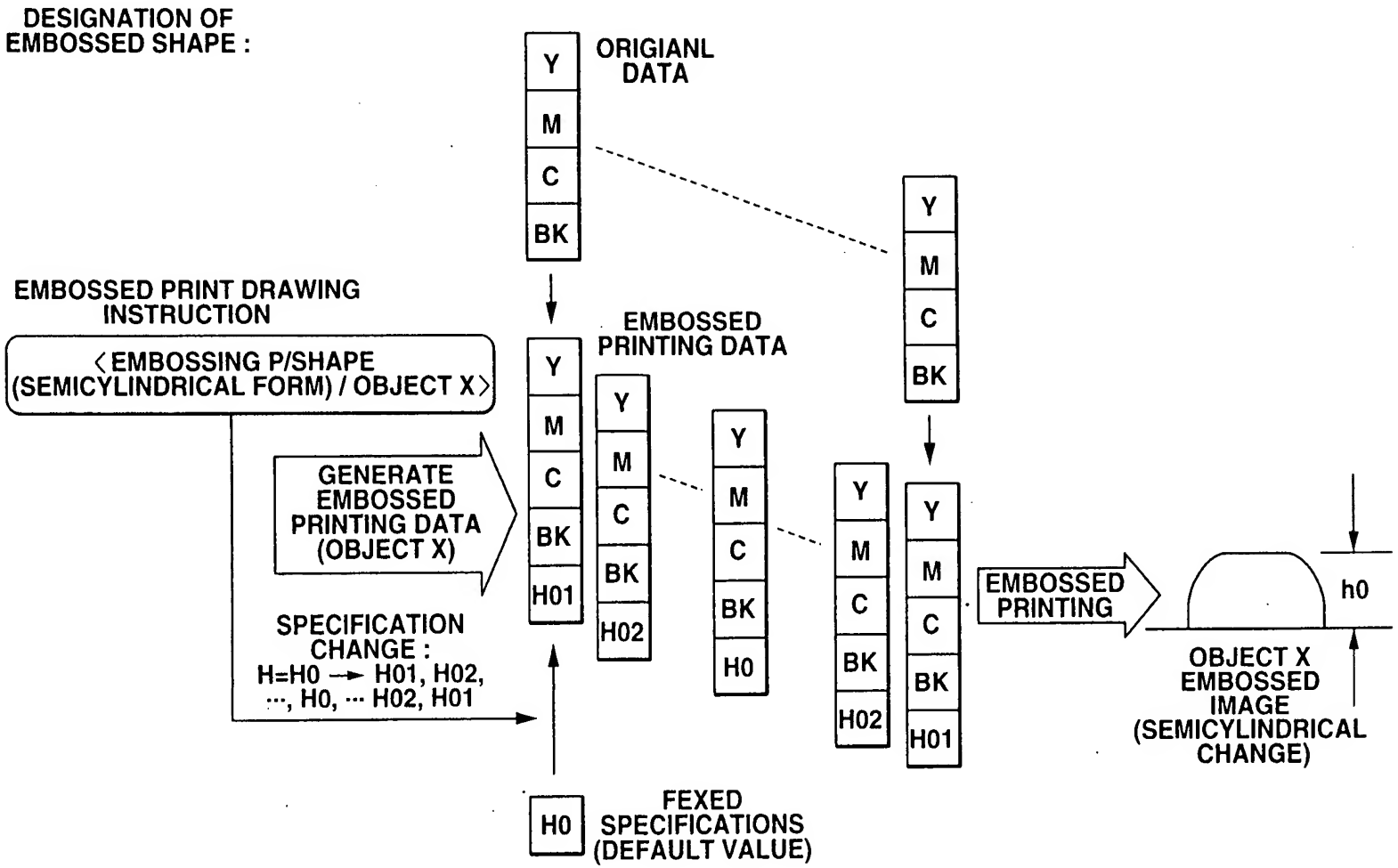
DESIGNATION OF EMBOSSED SHAPE :
Y
M
C
BK
ORIGIANL DATA
EMBOSSED PRINT DRAWING INSTRUCTION
〈EMBOSSING P/SHAPE (SEMICYLINDRICAL FORM) / OBJECT X〉
EMBOSSED PRINTING DATA
GENERATE EMBOSSED PRINTING DATA (OBJECT X)
H01
H02
H0
SPECIFICATION CHANGE :
H=H0 → H01, H02, ···, H0, ··· H02, H01
EMBOSSED PRINTING
h0
OBJECT X EMBOSSED IMAGE (SEMICYLINDRICAL CHANGE)
FEXED SPECIFICATIONS (DEFAULT VALUE)

FIG.23

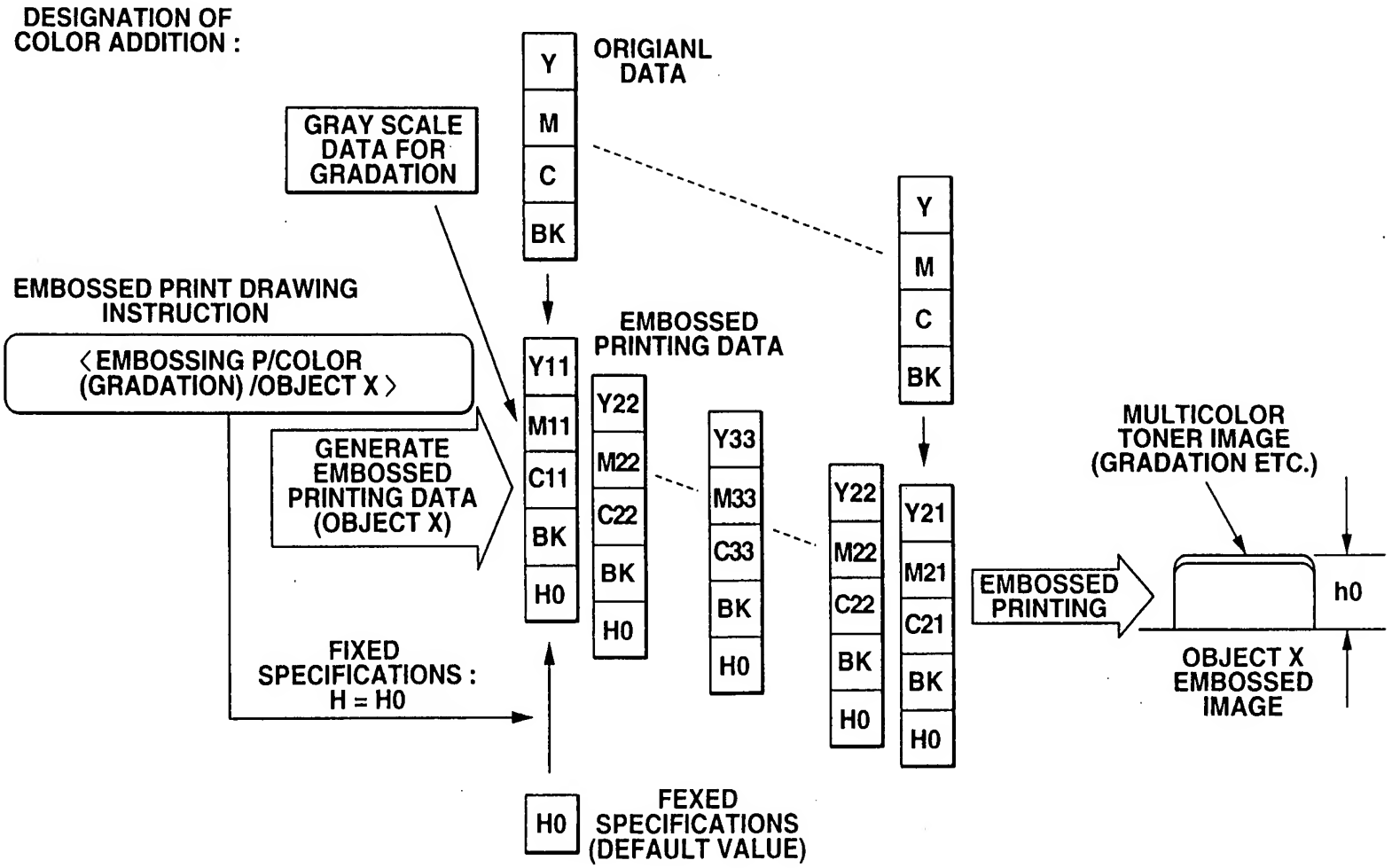
DESIGNATION OF COLOR ADDITION :
GRAY SCALE DATA FOR GRADATION
EMBOSSED PRINT DRAWING INSTRUCTION
〈EMBOSSING P/COLOR (GRADATION) /OBJECT X〉
GENERATE EMBOSSED PRINTING DATA (OBJECT X)
FIXED SPECIFICATIONS : H = H0
Y
M
C
BK
ORIGIANL DATA
EMBOSSED PRINTING DATA
Y11
M11
C11
BK
H0
Y22
M22
C22
BK
H0
Y33
M33
C33
BK
H0
Y22
M22
C22
BK
H0
Y21
M21
C21
BK
H0
H0
FEXED SPECIFICATIONS (DEFAULT VALUE)
MULTICOLOR TONER IMAGE (GRADATION ETC.)
EMBOSSED PRINTING
h0
OBJECT X EMBOSSED IMAGE

FIG.24

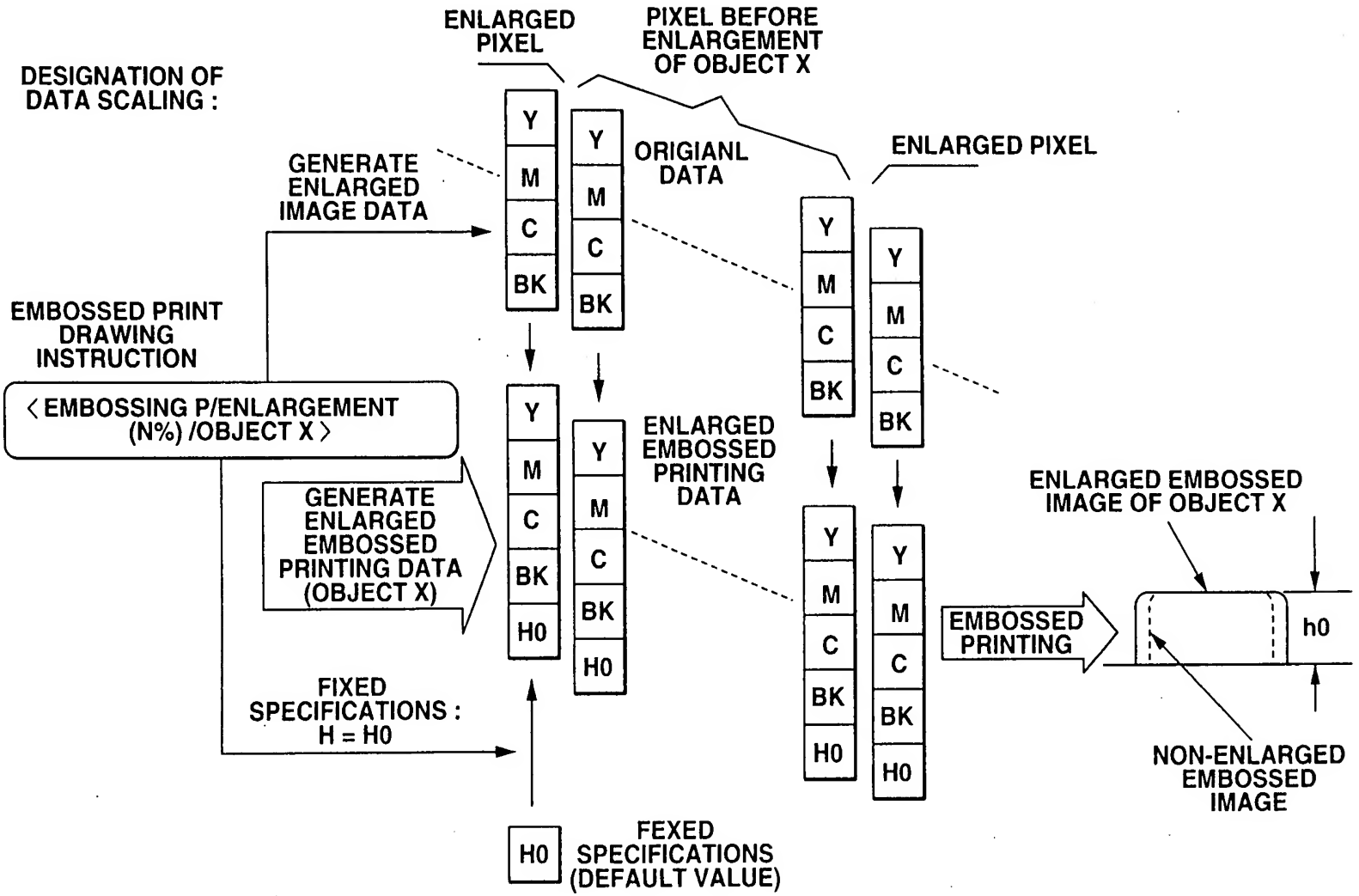
ENLARGED PIXEL
PIXEL BEFORE ENLARGEMENT OF OBJECT X
DESIGNATION OF DATA SCALING :
GENERATE ENLARGED IMAGE DATA
ORIGIANL DATA
ENLARGED PIXEL
EMBOSSED PRINT DRAWING INSTRUCTION
< EMBOSSING P/ENLARGEMENT (N%) /OBJECT X >
GENERATE ENLARGED EMBOSSED PRINTING DATA (OBJECT X)
ENLARGED EMBOSSED PRINTING DATA
ENLARGED EMBOSSED IMAGE OF OBJECT X
EMBOSSED PRINTING
h0
FIXED SPECIFICATIONS : H = H0
NON-ENLARGED EMBOSSED IMAGE
H0
FEXED SPECIFICATIONS (DEFAULT VALUE)
Y
M
C
BK
H0

FIG.25

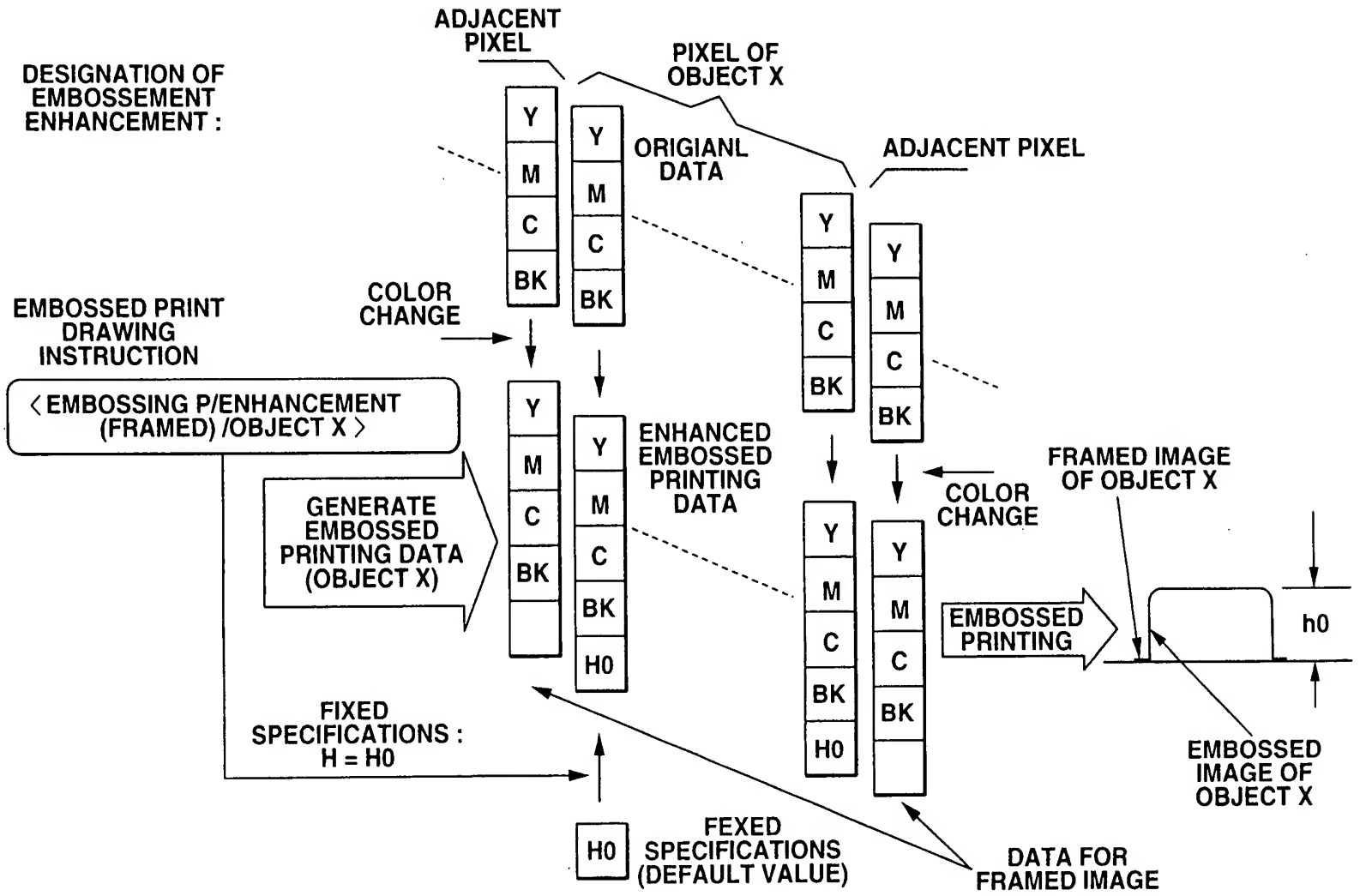
ADJACENT PIXEL
PIXEL OF OBJECT X
DESIGNATION OF EMBOSSEMENT ENHANCEMENT :
ORIGIANL DATA
ADJACENT PIXEL
Y
M
C
BK
COLOR CHANGE
EMBOSSED PRINT DRAWING INSTRUCTION
〈EMBOSSING P/ENHANCEMENT (FRAMED) /OBJECT X〉
ENHANCED EMBOSSED PRINTING DATA
FRAMED IMAGE OF OBJECT X
COLOR CHANGE
GENERATE EMBOSSED PRINTING DATA (OBJECT X)
EMBOSSED PRINTING
h0
H0
FIXED SPECIFICATIONS : H = H0
EMBOSSED IMAGE OF OBJECT X
FEXED SPECIFICATIONS (DEFAULT VALUE)
DATA FOR FRAMED IMAGE

FIG.26

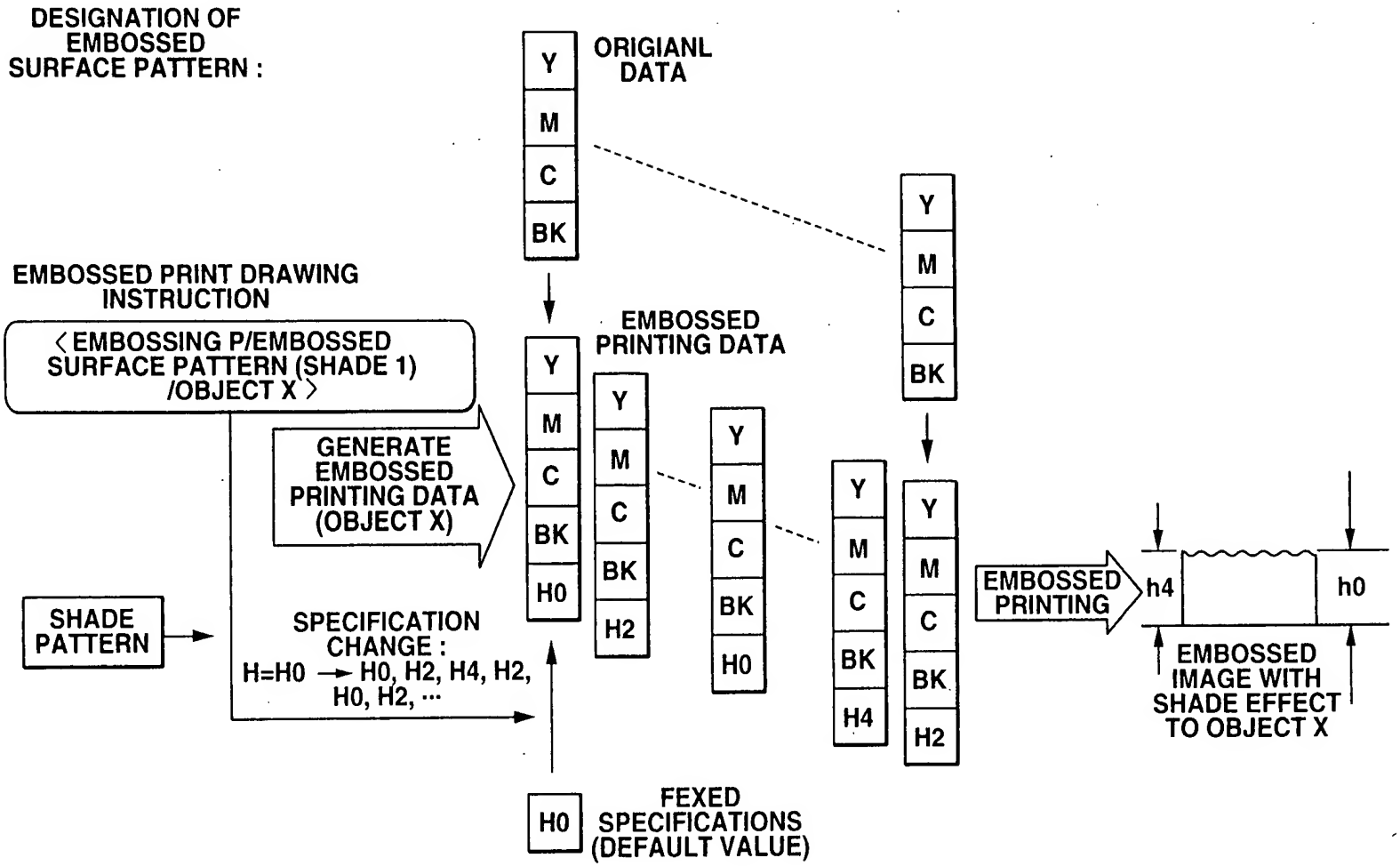
DESIGNATION OF EMBOSSED SURFACE PATTERN :
Y
M
C
BK
ORIGIANL DATA
EMBOSSED PRINT DRAWING INSTRUCTION
〈EMBOSSING P/EMBOSSED SURFACE PATTERN (SHADE 1) /OBJECT X〉
GENERATE EMBOSSED PRINTING DATA (OBJECT X)
EMBOSSED PRINTING DATA
H0
H2
H4
SHADE PATTERN
SPECIFICATION CHANGE :
H=H0 → H0, H2, H4, H2, H0, H2, ···
H0
FEXED SPECIFICATIONS (DEFAULT VALUE)
EMBOSSED PRINTING
h4
h0
EMBOSSED IMAGE WITH SHADE EFFECT TO OBJECT X

FIG.27

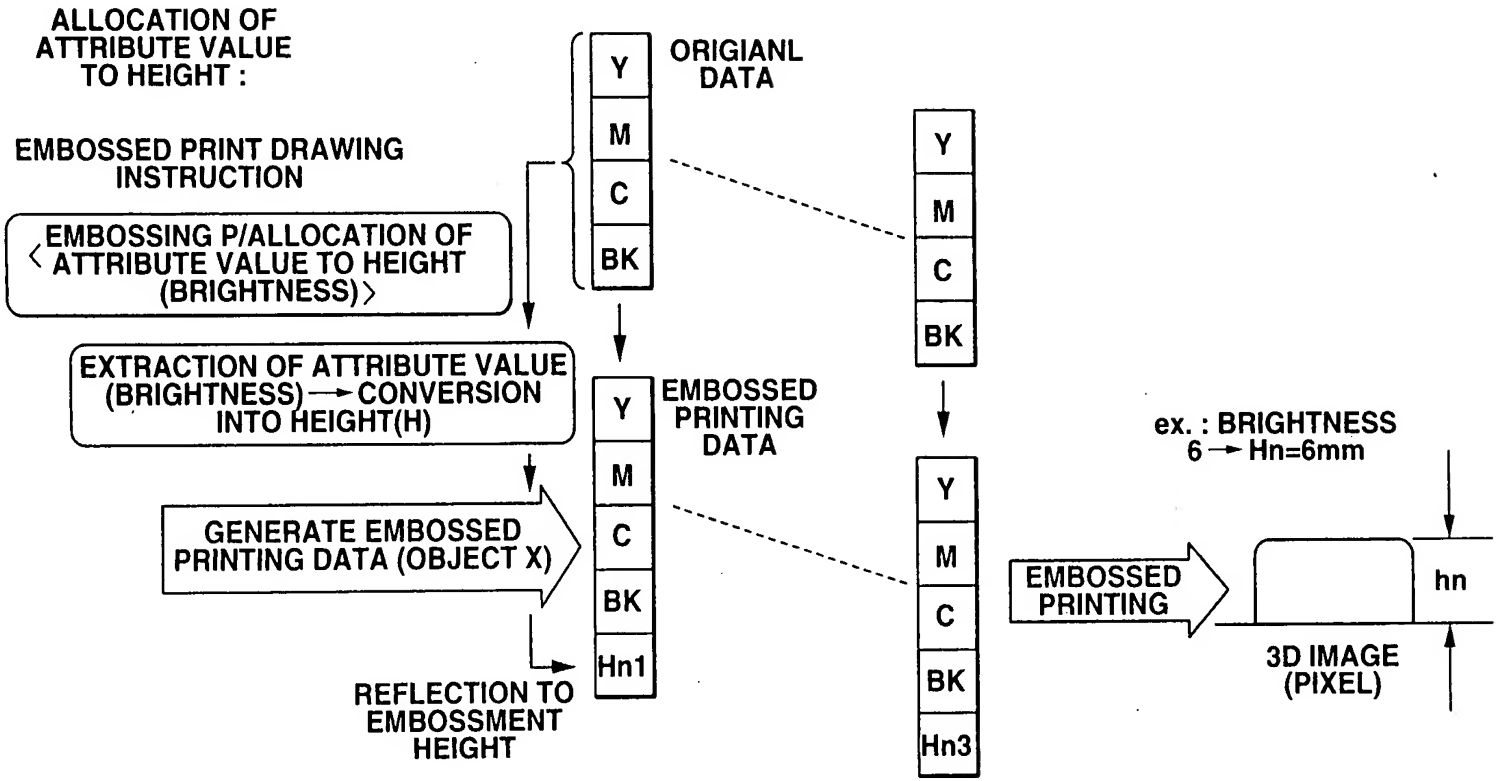
ALLOCATION OF ATTRIBUTE VALUE TO HEIGHT :
EMBOSSED PRINT DRAWING INSTRUCTION
EMBOSSING P/ALLOCATION OF ATTRIBUTE VALUE TO HEIGHT (BRIGHTNESS)
EXTRACTION OF ATTRIBUTE VALUE (BRIGHTNESS) → CONVERSION INTO HEIGHT(H)
GENERATE EMBOSSED PRINTING DATA (OBJECT X)
REFLECTION TO EMBOSSMENT HEIGHT
Y
M
C
BK
Hn1
ORIGIANL DATA
EMBOSSED PRINTING DATA
Y
M
C
BK
Hn3
ex. : BRIGHTNESS 6 → Hn=6mm
EMBOSSED PRINTING
hn
3D IMAGE (PIXEL)

FIG.28

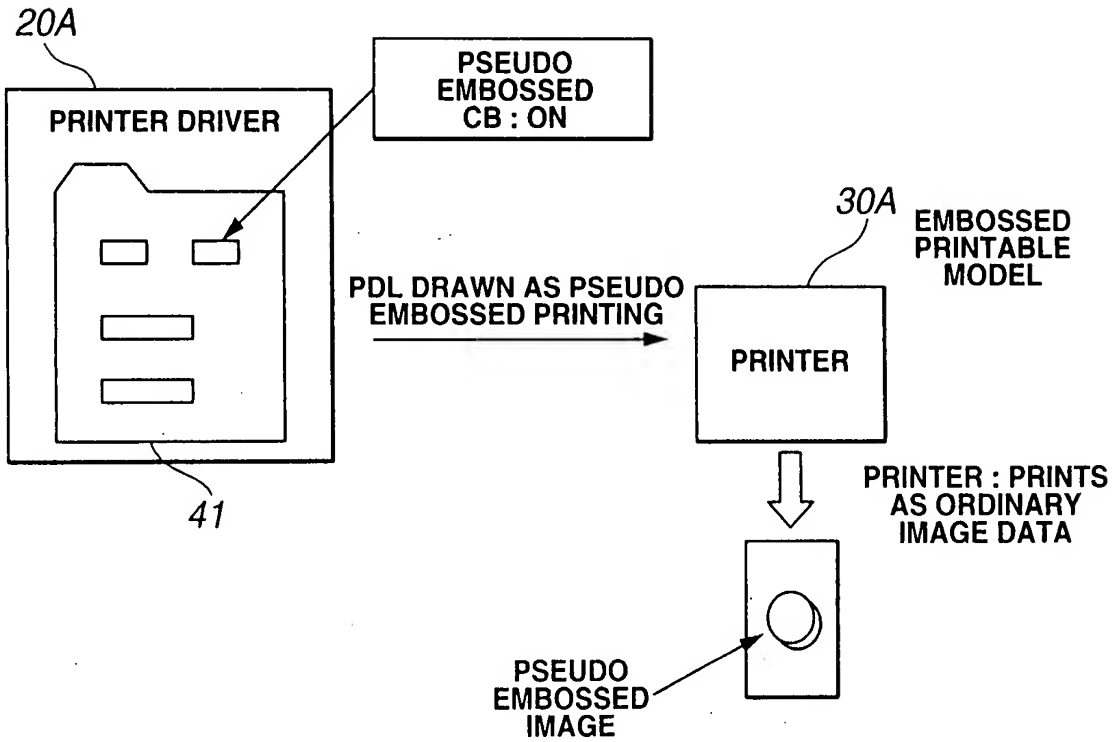
20A
PRINTER DRIVER
PSEUDO
EMBOSSED
CB : ON
41
PDL DRAWN AS PSEUDO
EMBOSSED PRINTING
30A
EMBOSSED
PRINTABLE
MODEL
PRINTER
PRINTER : PRINTS
AS ORDINARY
IMAGE DATA
PSEUDO
EMBOSSED
IMAGE

FIG.29

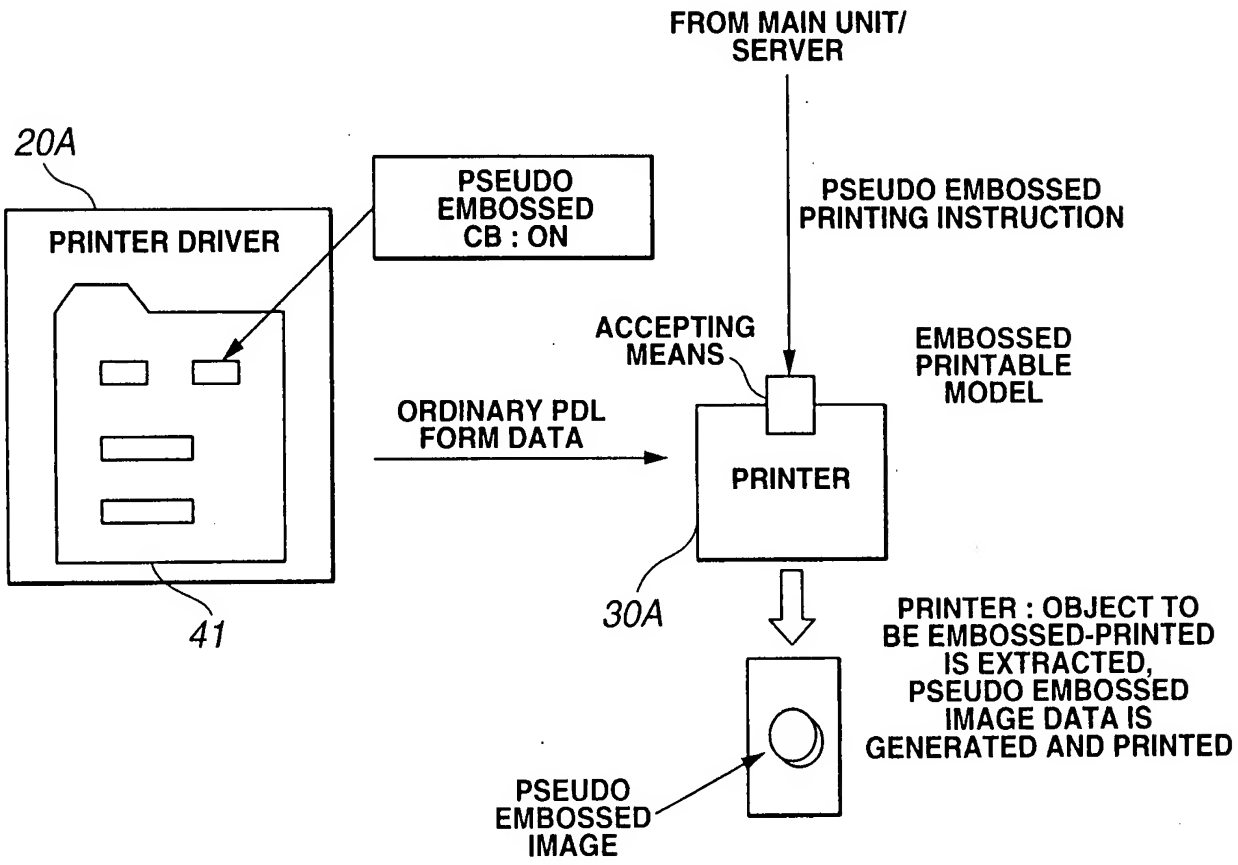
FROM MAIN UNIT/
SERVER
20A
PSEUDO
EMBOSSED
CB : ON
PSEUDO EMBOSSED
PRINTING INSTRUCTION
PRINTER DRIVER
ACCEPTING
MEANS
EMBOSSED
PRINTABLE
MODEL
ORDINARY PDL
FORM DATA
PRINTER
41
30A
PRINTER : OBJECT TO
BE EMBOSSED-PRINTED
IS EXTRACTED,
PSEUDO EMBOSSED
IMAGE DATA IS
GENERATED AND PRINTED
PSEUDO
EMBOSSED
IMAGE

FIG.30

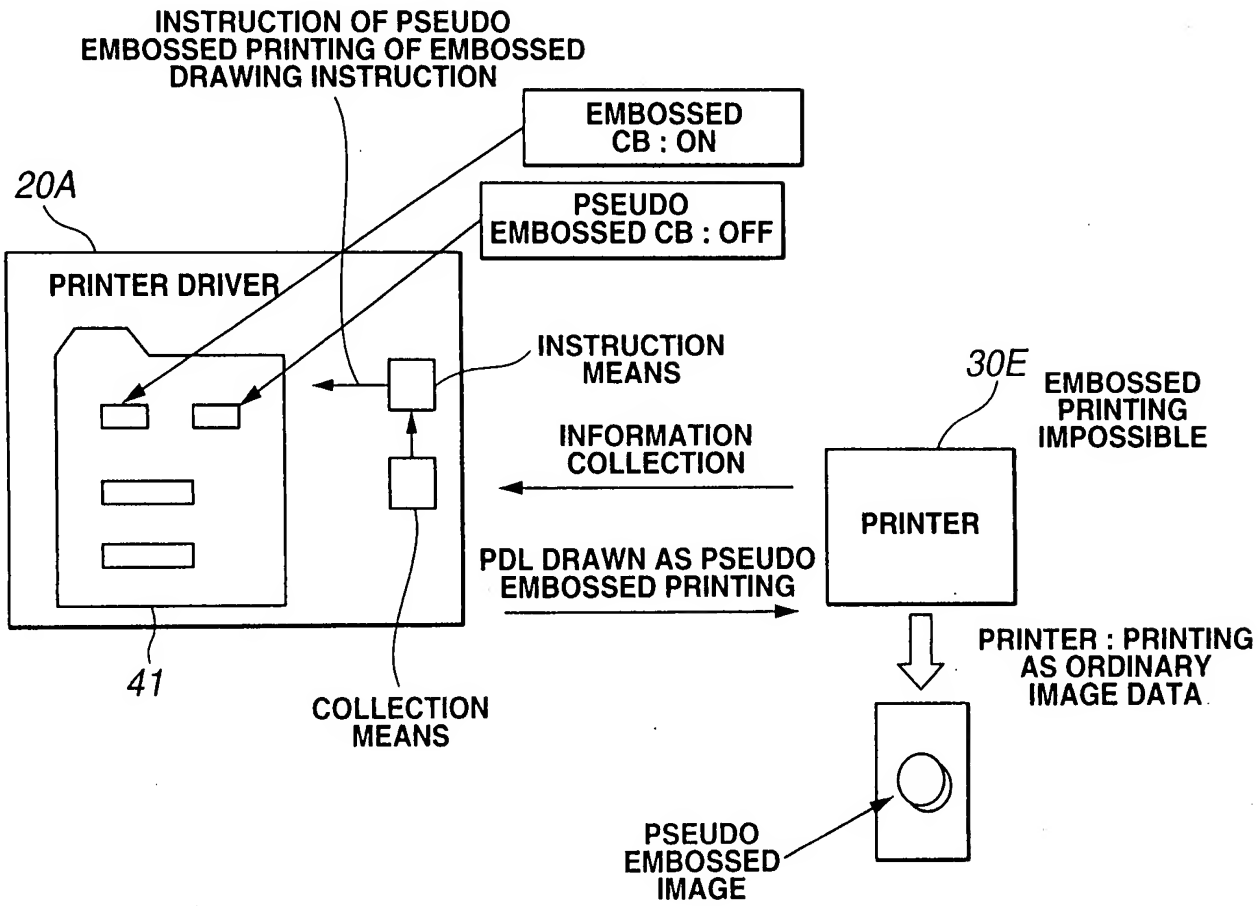
INSTRUCTION OF PSEUDO EMBOSSED PRINTING OF EMBOSSED DRAWING INSTRUCTION
EMBOSSED CB : ON
PSEUDO EMBOSSED CB : OFF
20A
PRINTER DRIVER
INSTRUCTION MEANS
30E
EMBOSSED PRINTING IMPOSSIBLE
INFORMATION COLLECTION
PRINTER
PDL DRAWN AS PSEUDO EMBOSSED PRINTING
PRINTER : PRINTING AS ORDINARY IMAGE DATA
41
COLLECTION MEANS
PSEUDO EMBOSSED IMAGE

FIG.31

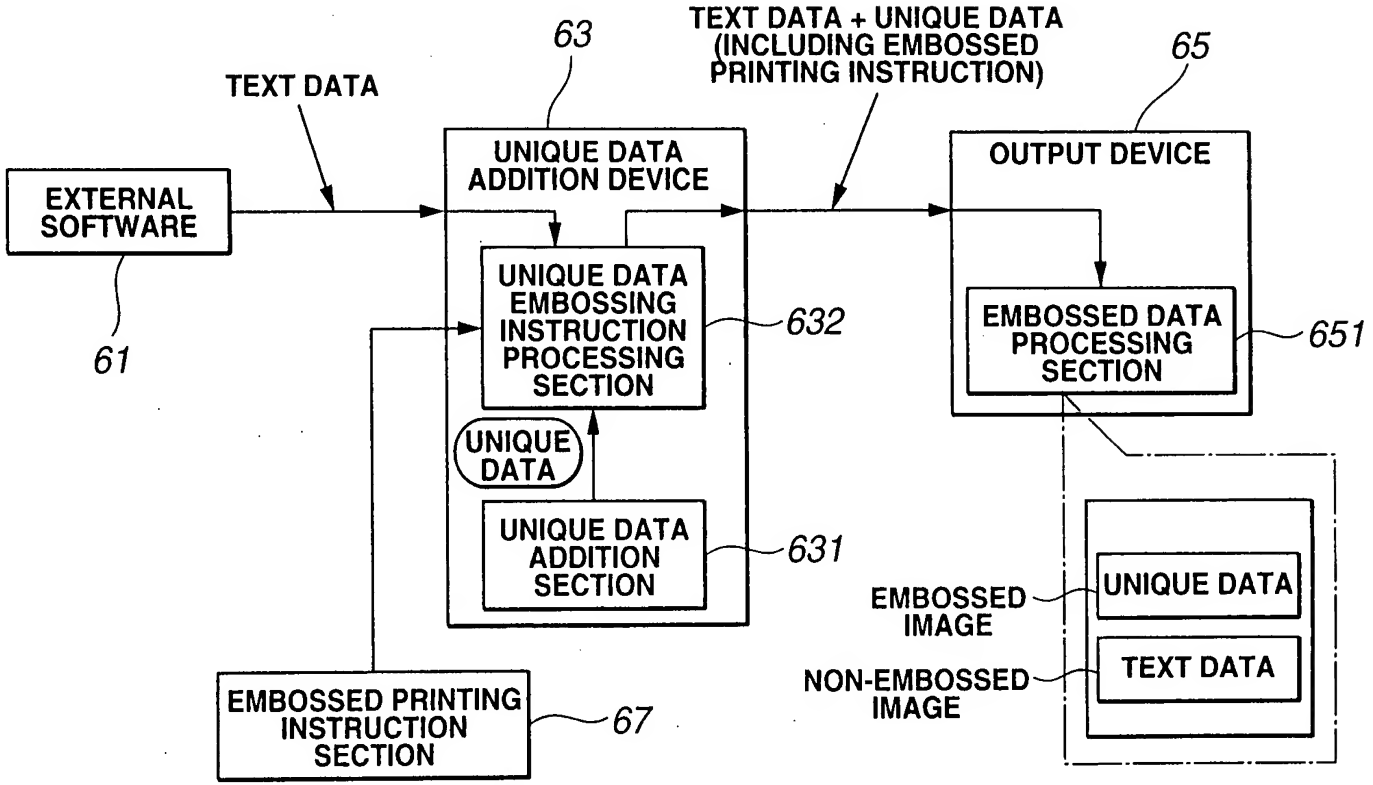
TEXT DATA
63
TEXT DATA + UNIQUE DATA
(INCLUDING EMBOSSED
PRINTING INSTRUCTION)
65
EXTERNAL
SOFTWARE
UNIQUE DATA
ADDITION DEVICE
OUTPUT DEVICE
UNIQUE DATA
EMBOSSING
INSTRUCTION
PROCESSING
SECTION
632
EMBOSSED DATA
PROCESSING
SECTION
651
61
UNIQUE
DATA
UNIQUE DATA
ADDITION
SECTION
631
EMBOSSED
IMAGE
UNIQUE DATA
NON-EMBOSSED
IMAGE
TEXT DATA
EMBOSSED PRINTING
INSTRUCTION
SECTION
67

FIG.32

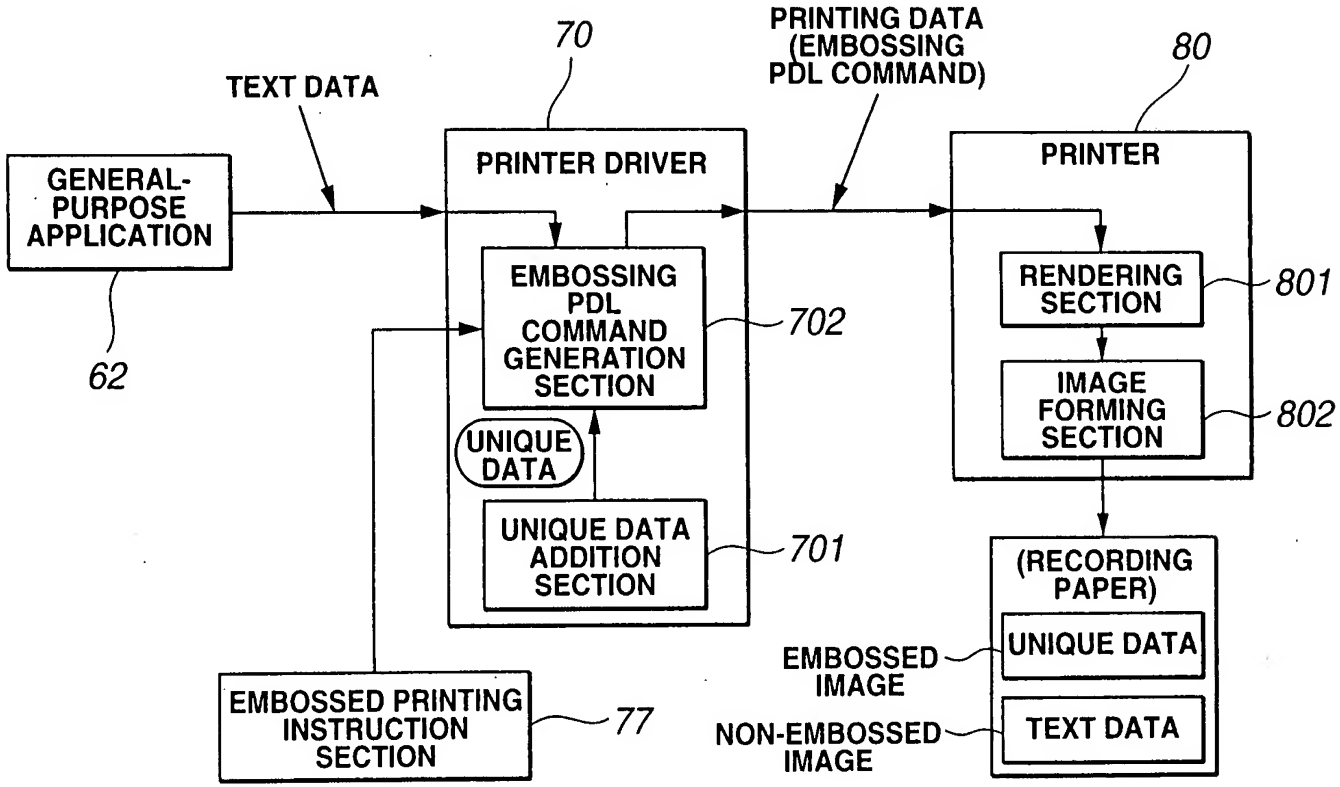
70
TEXT DATA
PRINTING DATA
(EMBOSSING
PDL COMMAND)
80
GENERAL-
PURPOSE
APPLICATION
PRINTER DRIVER
PRINTER
EMBOSSING
PDL
COMMAND
GENERATION
SECTION
702
RENDERING
SECTION
801
IMAGE
FORMING
SECTION
802
62
UNIQUE
DATA
UNIQUE DATA
ADDITION
SECTION
701
(RECORDING
PAPER)
EMBOSSED
IMAGE
UNIQUE DATA
NON-EMBOSSED
IMAGE
TEXT DATA
EMBOSSED PRINTING
INSTRUCTION
SECTION
77

FIG.33

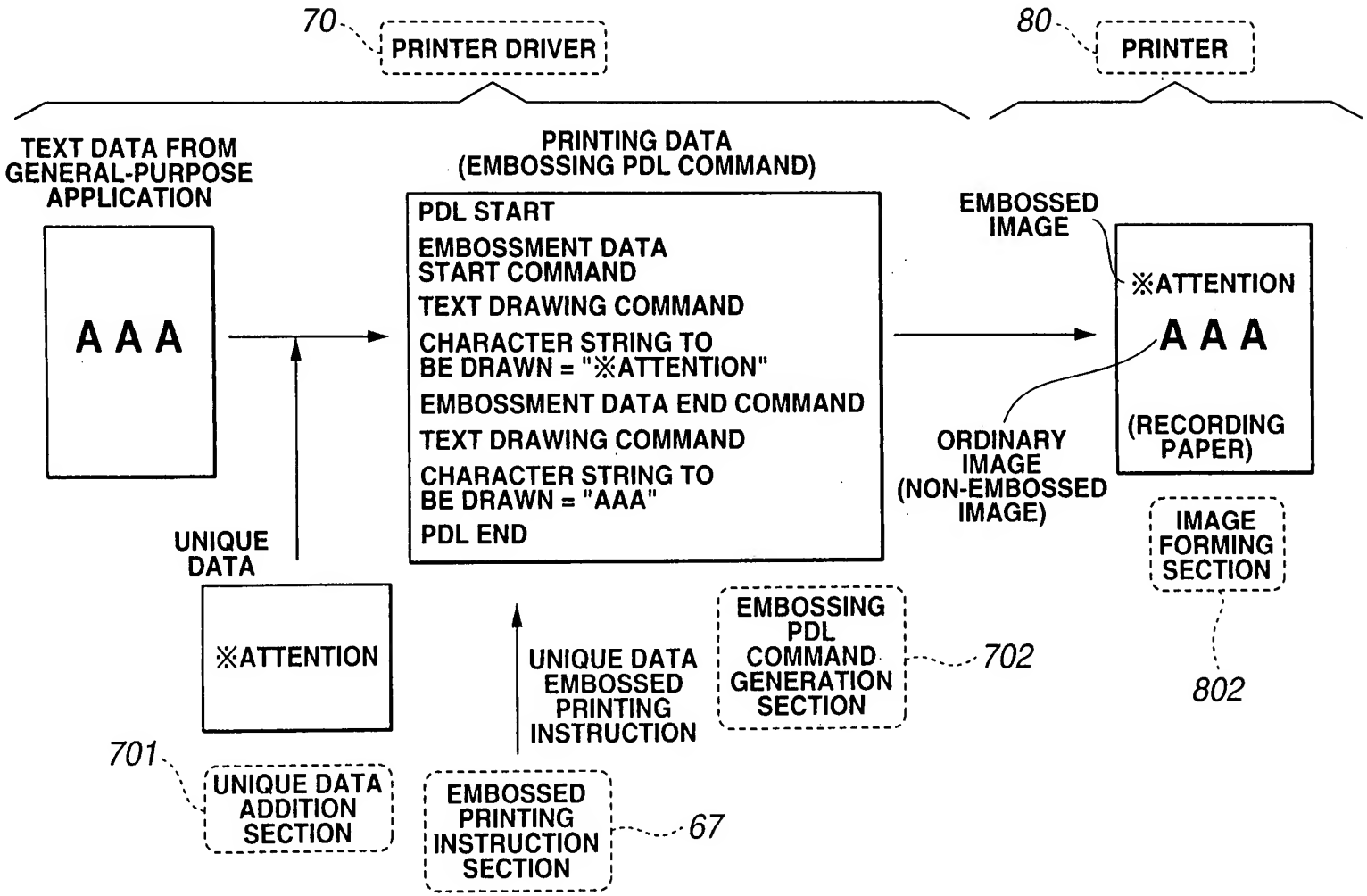
70
PRINTER DRIVER
80
PRINTER
TEXT DATA FROM GENERAL-PURPOSE APPLICATION
A A A
PRINTING DATA (EMBOSSING PDL COMMAND)
PDL START
EMBOSSMENT DATA START COMMAND
TEXT DRAWING COMMAND
CHARACTER STRING TO BE DRAWN = "※ATTENTION"
EMBOSSMENT DATA END COMMAND
TEXT DRAWING COMMAND
CHARACTER STRING TO BE DRAWN = "AAA"
PDL END
EMBOSSED IMAGE
※ATTENTION
A A A
(RECORDING PAPER)
ORDINARY IMAGE (NON-EMBOSSED IMAGE)
IMAGE FORMING SECTION
802
UNIQUE DATA
※ATTENTION
UNIQUE DATA EMBOSSED PRINTING INSTRUCTION
EMBOSSING PDL COMMAND GENERATION SECTION
702
701
UNIQUE DATA ADDITION SECTION
EMBOSSED PRINTING INSTRUCTION SECTION
67

FIG.34

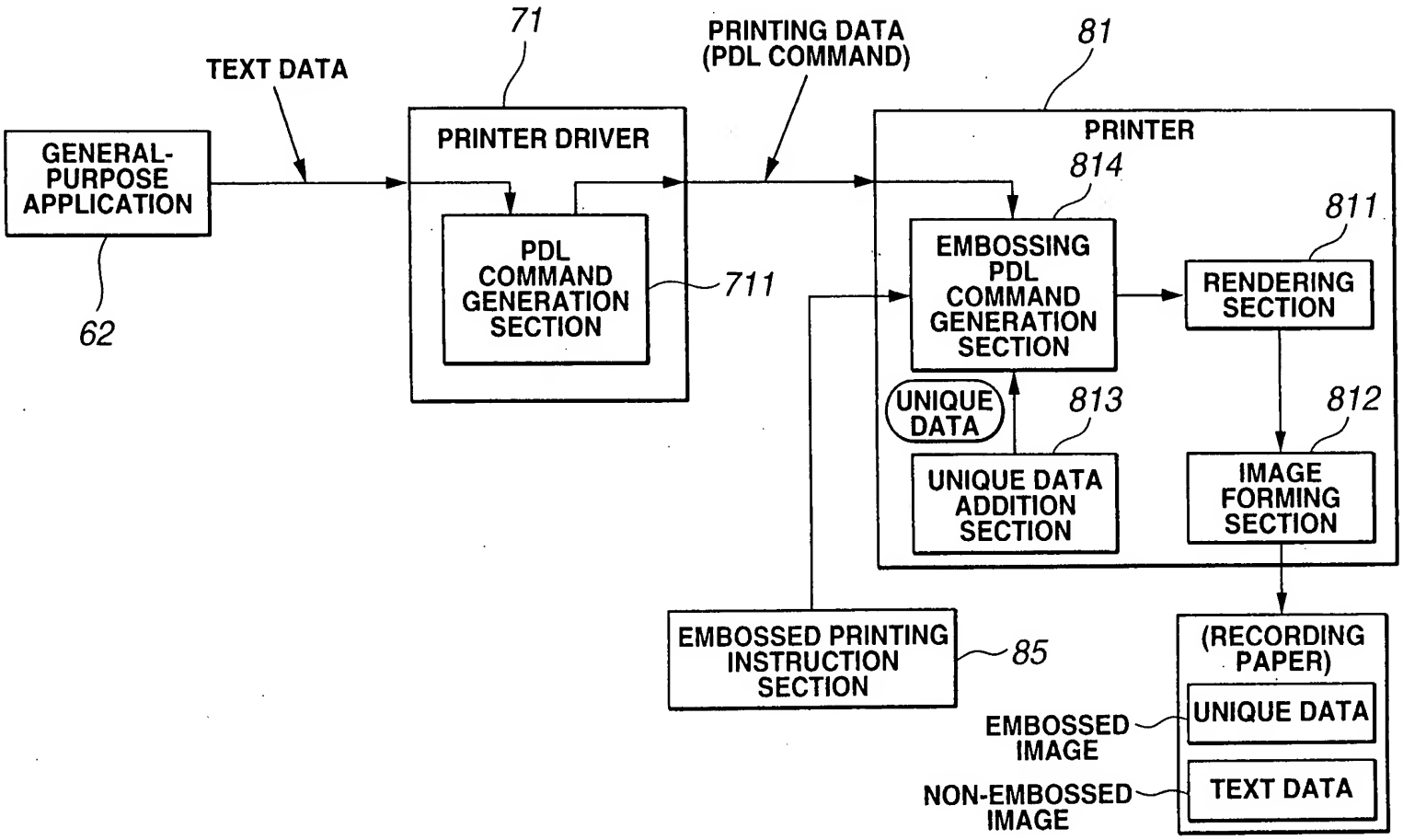
71
TEXT DATA
PRINTING DATA
(PDL COMMAND)
81
GENERAL-
PURPOSE
APPLICATION
PRINTER DRIVER
PRINTER
814
811
PDL
COMMAND
GENERATION
SECTION
711
EMBOSSING
PDL
COMMAND
GENERATION
SECTION
RENDERING
SECTION
62
UNIQUE
DATA
813
812
UNIQUE DATA
ADDITION
SECTION
IMAGE
FORMING
SECTION
EMBOSSED PRINTING
INSTRUCTION
SECTION
85
(RECORDING
PAPER)
EMBOSSED
IMAGE
UNIQUE DATA
NON-EMBOSSED
IMAGE
TEXT DATA

FIG.35

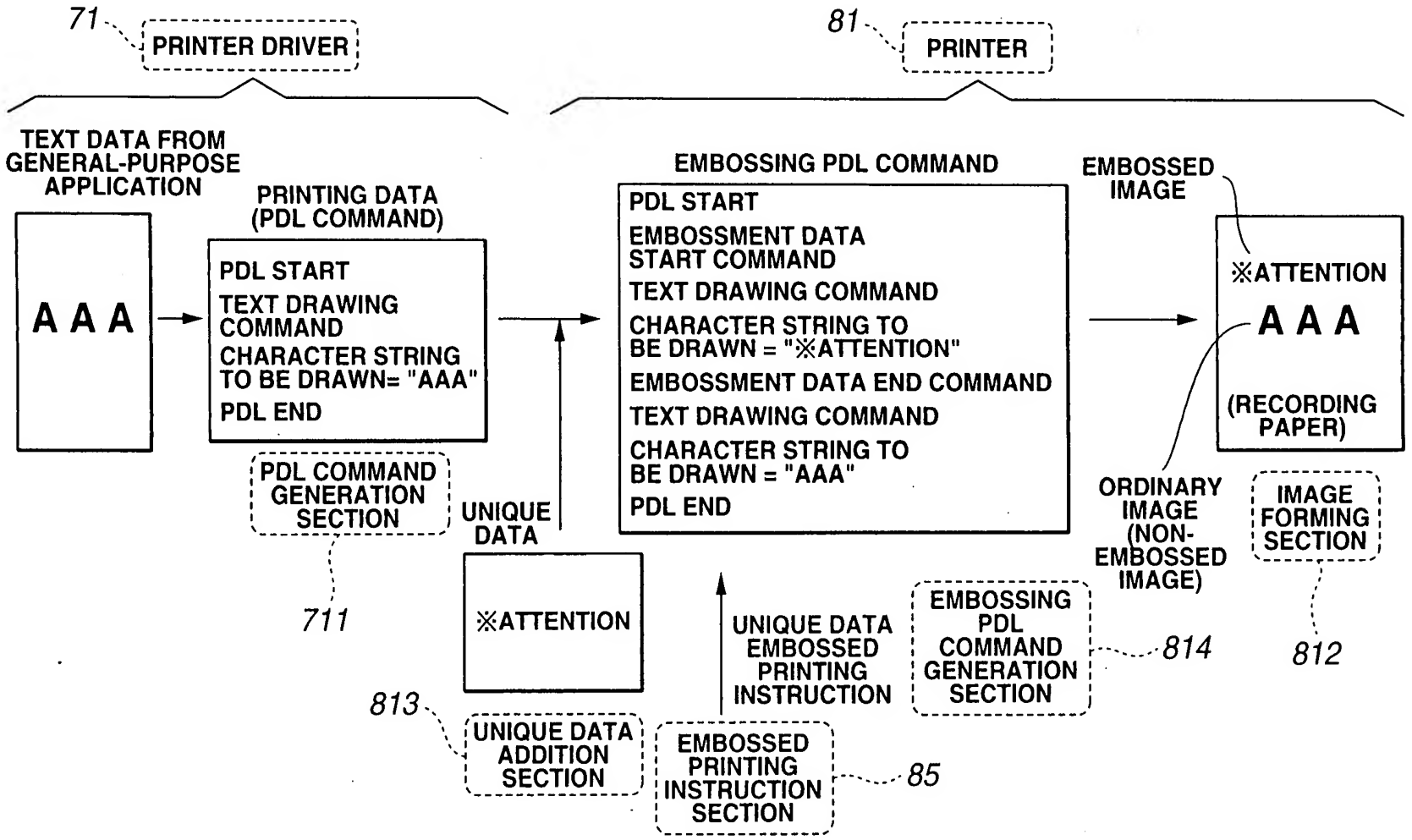
71
PRINTER DRIVER
81
PRINTER
TEXT DATA FROM GENERAL-PURPOSE APPLICATION
A A A
PRINTING DATA (PDL COMMAND)
PDL START
TEXT DRAWING COMMAND
CHARACTER STRING TO BE DRAWN= "AAA"
PDL END
PDL COMMAND GENERATION SECTION
711
UNIQUE DATA
※ATTENTION
813
UNIQUE DATA ADDITION SECTION
EMBOSSING PDL COMMAND
PDL START
EMBOSSMENT DATA START COMMAND
TEXT DRAWING COMMAND
CHARACTER STRING TO BE DRAWN = "※ATTENTION"
EMBOSSMENT DATA END COMMAND
TEXT DRAWING COMMAND
CHARACTER STRING TO BE DRAWN = "AAA"
PDL END
UNIQUE DATA EMBOSSED PRINTING INSTRUCTION
EMBOSSED PRINTING INSTRUCTION SECTION
85
EMBOSSING PDL COMMAND GENERATION SECTION
814
EMBOSSED IMAGE
※ATTENTION
A A A
(RECORDING PAPER)
ORDINARY IMAGE (NON-EMBOSSED IMAGE)
IMAGE FORMING SECTION
812

FIG.36

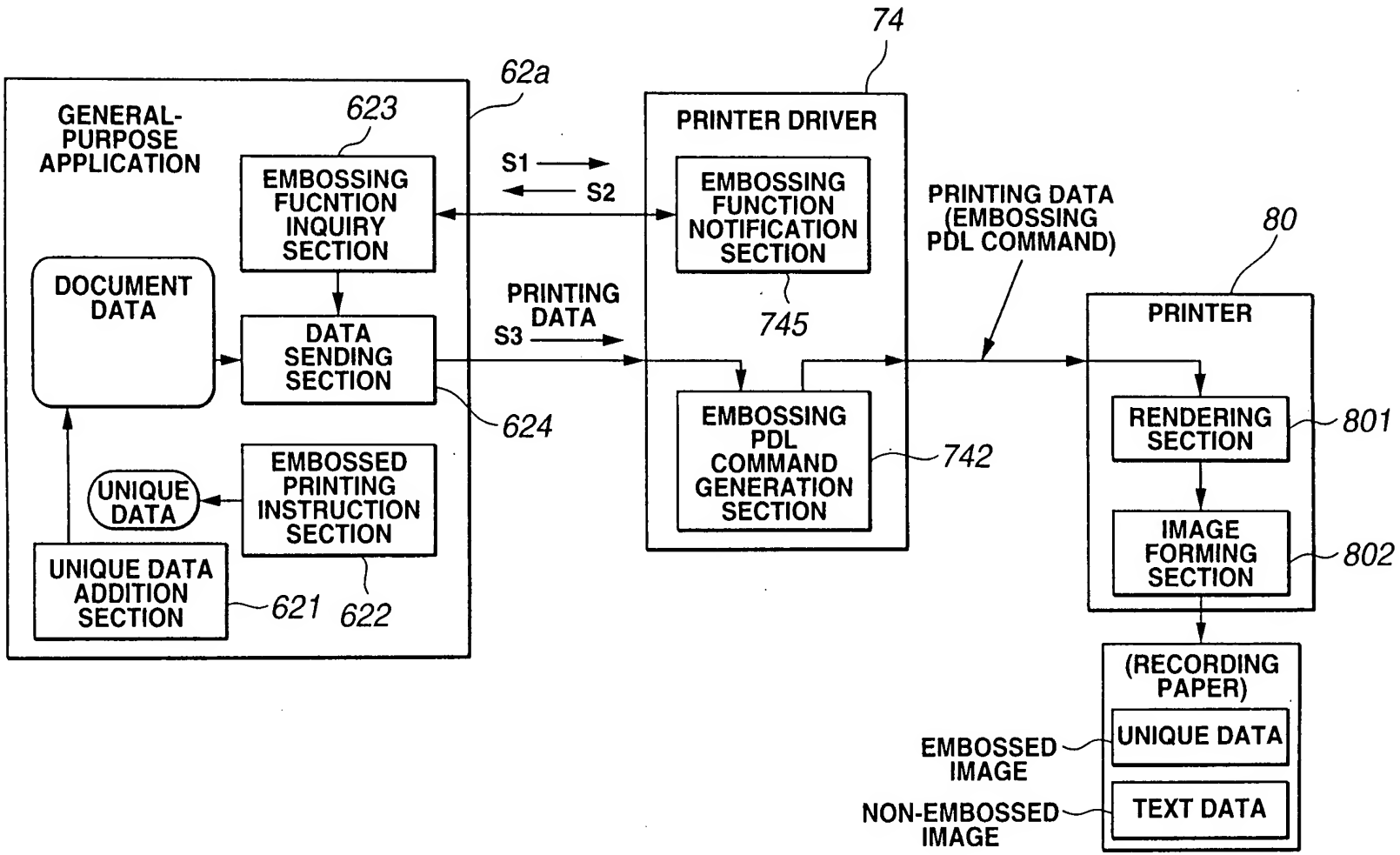
74
62a
GENERAL-PURPOSE APPLICATION
623
EMBOSSING FUCNTION INQUIRY SECTION
S1
S2
PRINTER DRIVER
EMBOSSING FUNCTION NOTIFICATION SECTION
745
PRINTING DATA (EMBOSSING PDL COMMAND)
80
PRINTER
DOCUMENT DATA
DATA SENDING SECTION
PRINTING DATA
S3
624
EMBOSSING PDL COMMAND GENERATION SECTION
742
RENDERING SECTION
801
IMAGE FORMING SECTION
802
UNIQUE DATA
EMBOSSED PRINTING INSTRUCTION SECTION
UNIQUE DATA ADDITION SECTION
621
622
(RECORDING PAPER)
UNIQUE DATA
EMBOSSED IMAGE
TEXT DATA
NON-EMBOSSED IMAGE

FIG.37

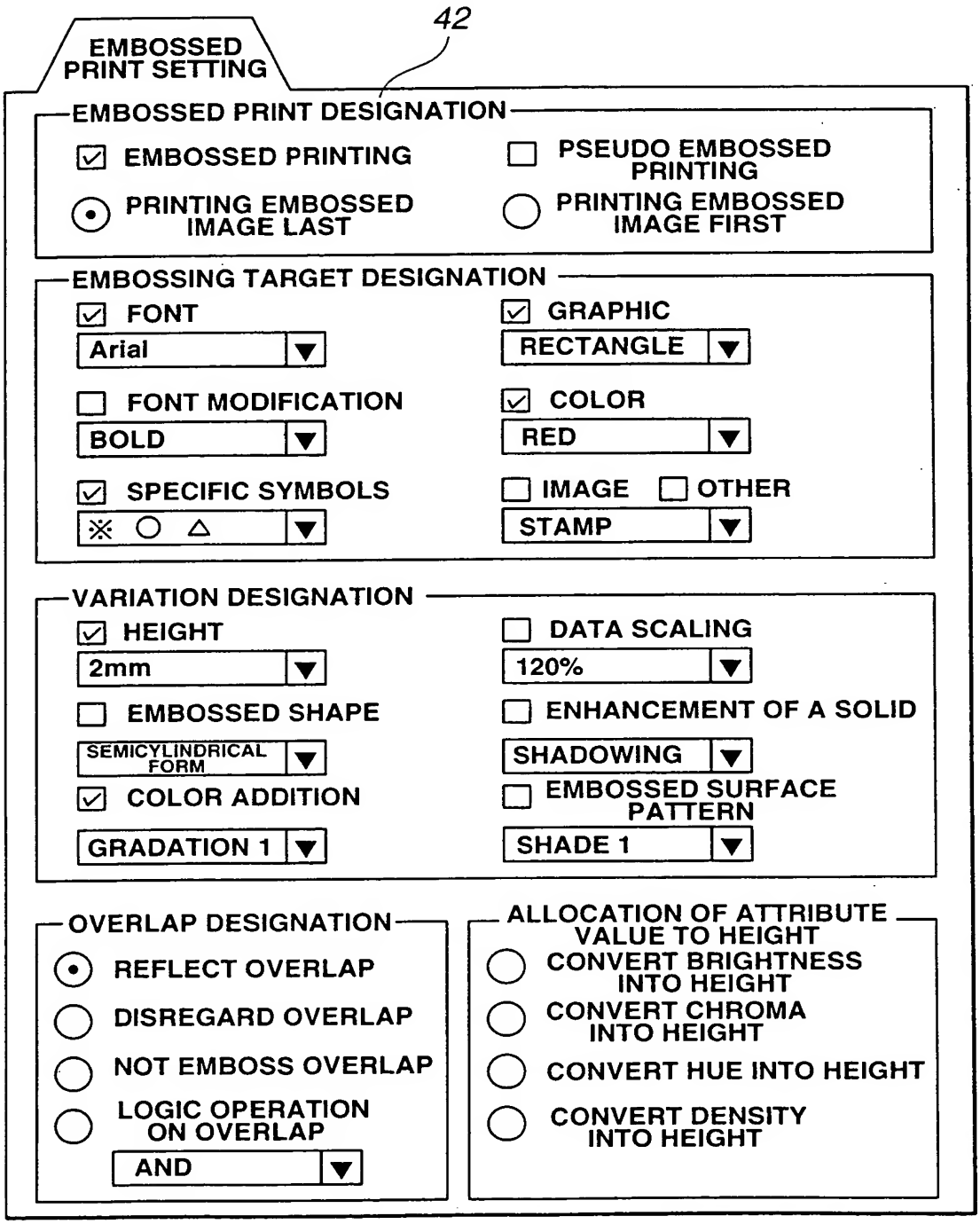
42
EMBOSSED PRINT SETTING
EMBOSSED PRINT DESIGNATION
EMBOSSED PRINTING
PSEUDO EMBOSSED PRINTING
PRINTING EMBOSSED IMAGE LAST
PRINTING EMBOSSED IMAGE FIRST
EMBOSSING TARGET DESIGNATION
FONT
Arial
GRAPHIC
RECTANGLE
FONT MODIFICATION
BOLD
COLOR
RED
SPECIFIC SYMBOLS
※ ○ △
IMAGE
OTHER
STAMP
VARIATION DESIGNATION
HEIGHT
2mm
DATA SCALING
120%
EMBOSSED SHAPE
SEMICYLINDRICAL FORM
ENHANCEMENT OF A SOLID
SHADOWING
COLOR ADDITION
GRADATION 1
EMBOSSED SURFACE PATTERN
SHADE 1
OVERLAP DESIGNATION
REFLECT OVERLAP
DISREGARD OVERLAP
NOT EMBOSS OVERLAP
LOGIC OPERATION ON OVERLAP
AND
ALLOCATION OF ATTRIBUTE VALUE TO HEIGHT
CONVERT BRIGHTNESS INTO HEIGHT
CONVERT CHROMA INTO HEIGHT
CONVERT HUE INTO HEIGHT
CONVERT DENSITY INTO HEIGHT

FIG.38A

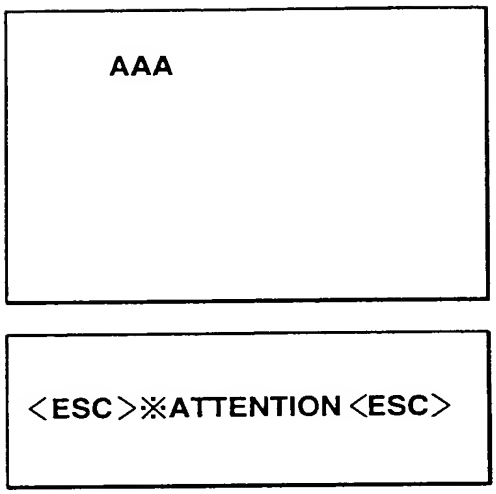

FIG.38B

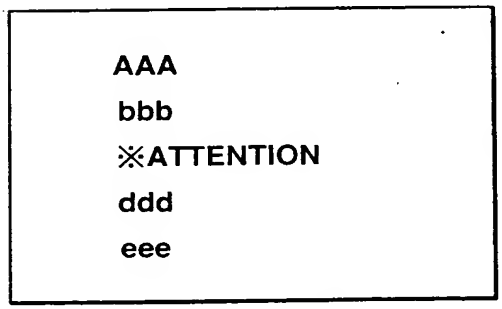

FIG.39

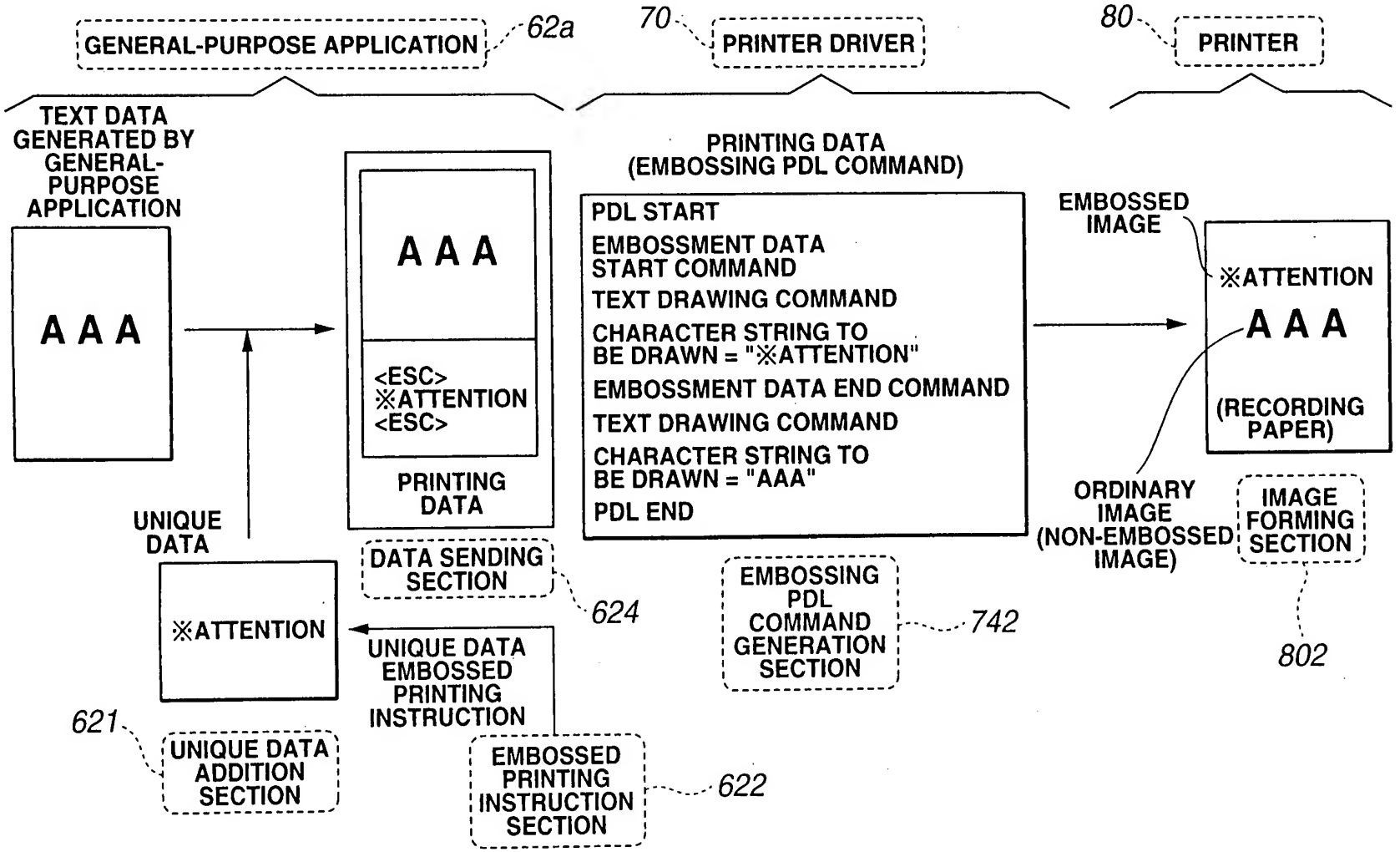
GENERAL-PURPOSE APPLICATION
62a
70
PRINTER DRIVER
80
PRINTER
TEXT DATA GENERATED BY GENERAL-PURPOSE APPLICATION
A A A
A A A
<ESC>
※ATTENTION
<ESC>
PRINTING DATA
PRINTING DATA (EMBOSSING PDL COMMAND)
PDL START
EMBOSSMENT DATA START COMMAND
TEXT DRAWING COMMAND
CHARACTER STRING TO BE DRAWN = "※ATTENTION"
EMBOSSMENT DATA END COMMAND
TEXT DRAWING COMMAND
CHARACTER STRING TO BE DRAWN = "AAA"
PDL END
EMBOSSED IMAGE
※ATTENTION
A A A
(RECORDING PAPER)
ORDINARY IMAGE (NON-EMBOSSED IMAGE)
IMAGE FORMING SECTION
802
UNIQUE DATA
※ATTENTION
621
UNIQUE DATA ADDITION SECTION
DATA SENDING SECTION
624
UNIQUE DATA EMBOSSED PRINTING INSTRUCTION
EMBOSSED PRINTING INSTRUCTION SECTION
622
EMBOSSING PDL COMMAND GENERATION SECTION
742

FIG.40

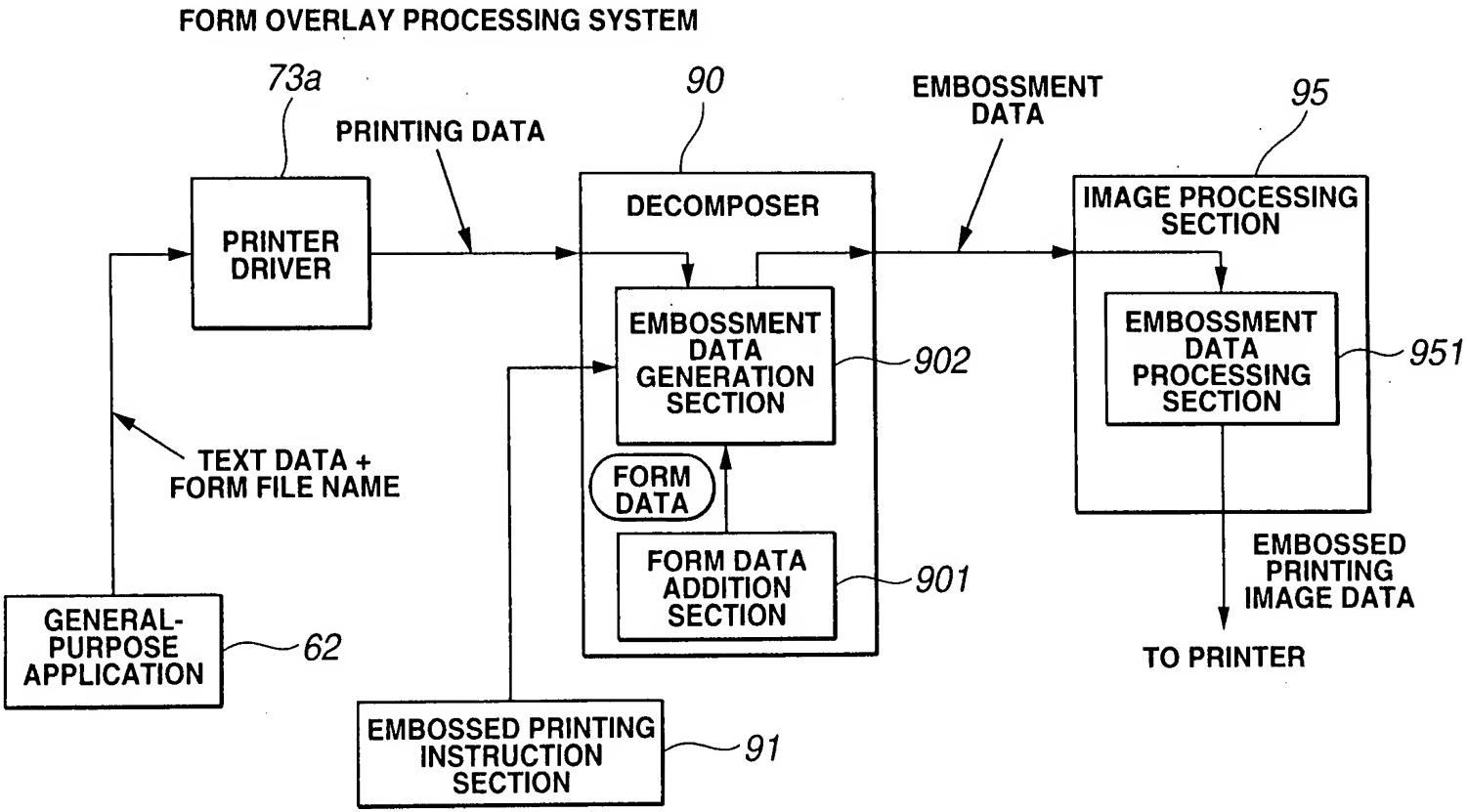
FORM OVERLAY PROCESSING SYSTEM
73a
PRINTING DATA
90
EMBOSSMENT DATA
95
PRINTER DRIVER
DECOMPOSER
IMAGE PROCESSING SECTION
EMBOSSMENT DATA GENERATION SECTION
902
EMBOSSMENT DATA PROCESSING SECTION
951
TEXT DATA + FORM FILE NAME
FORM DATA
FORM DATA ADDITION SECTION
901
EMBOSSED PRINTING IMAGE DATA
GENERAL-PURPOSE APPLICATION
62
TO PRINTER
EMBOSSED PRINTING INSTRUCTION SECTION
91

FIG.41

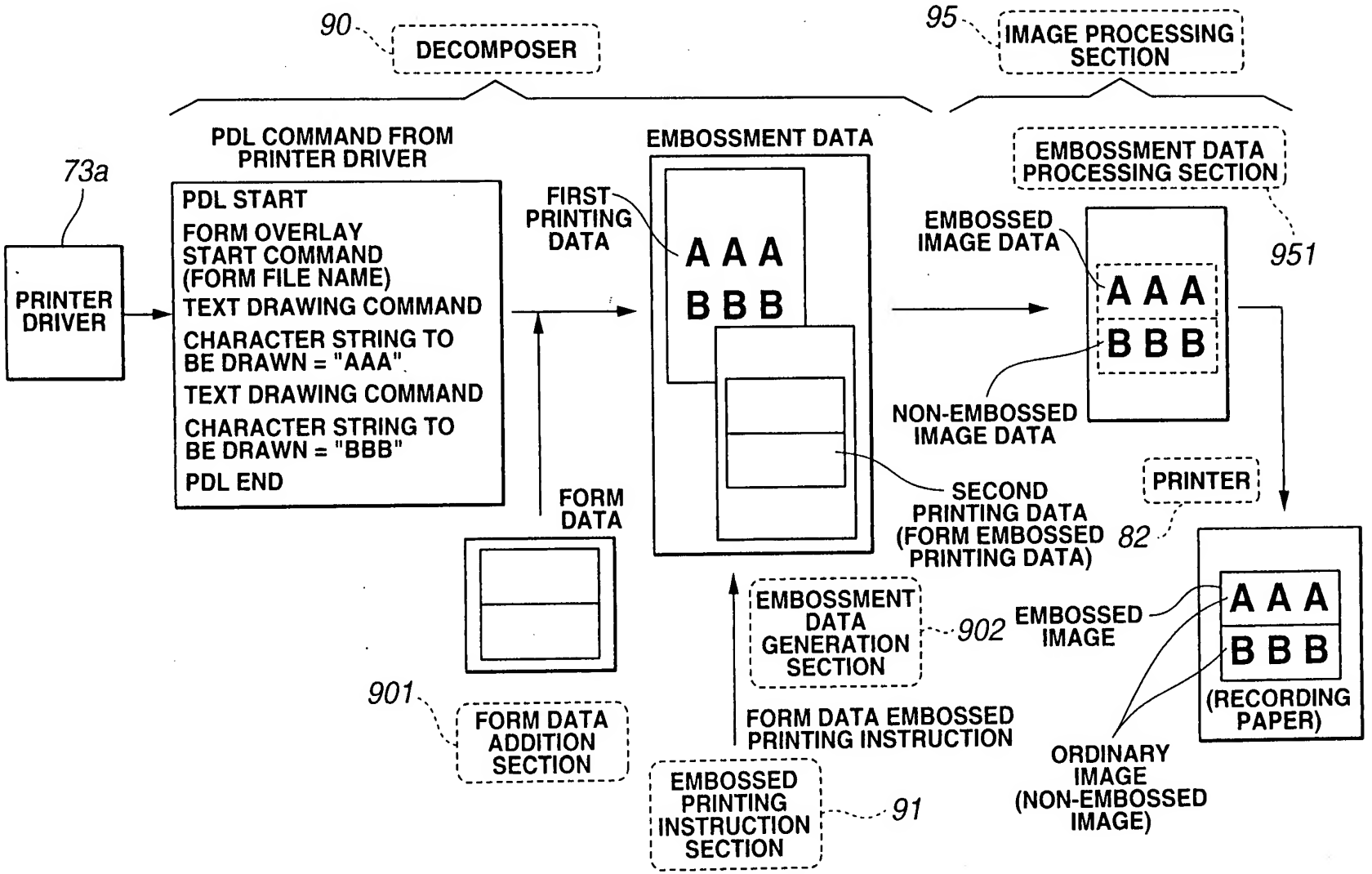
90
DECOMPOSER
95
IMAGE PROCESSING SECTION
PDL COMMAND FROM PRINTER DRIVER
EMBOSSMENT DATA
EMBOSSMENT DATA PROCESSING SECTION
951
73a
PRINTER DRIVER
PDL START
FORM OVERLAY START COMMAND (FORM FILE NAME)
TEXT DRAWING COMMAND
CHARACTER STRING TO BE DRAWN = "AAA"
TEXT DRAWING COMMAND
CHARACTER STRING TO BE DRAWN = "BBB"
PDL END
FIRST PRINTING DATA
A A A
B B B
EMBOSSED IMAGE DATA
A A A
B B B
NON-EMBOSSED IMAGE DATA
SECOND PRINTING DATA (FORM EMBOSSED PRINTING DATA)
PRINTER
82
FORM DATA
EMBOSSMENT DATA GENERATION SECTION
902
EMBOSSED IMAGE
A A A
B B B
(RECORDING PAPER)
901
FORM DATA ADDITION SECTION
FORM DATA EMBOSSED PRINTING INSTRUCTION
ORDINARY IMAGE (NON-EMBOSSED IMAGE)
EMBOSSED PRINTING INSTRUCTION SECTION
91

FIG.42

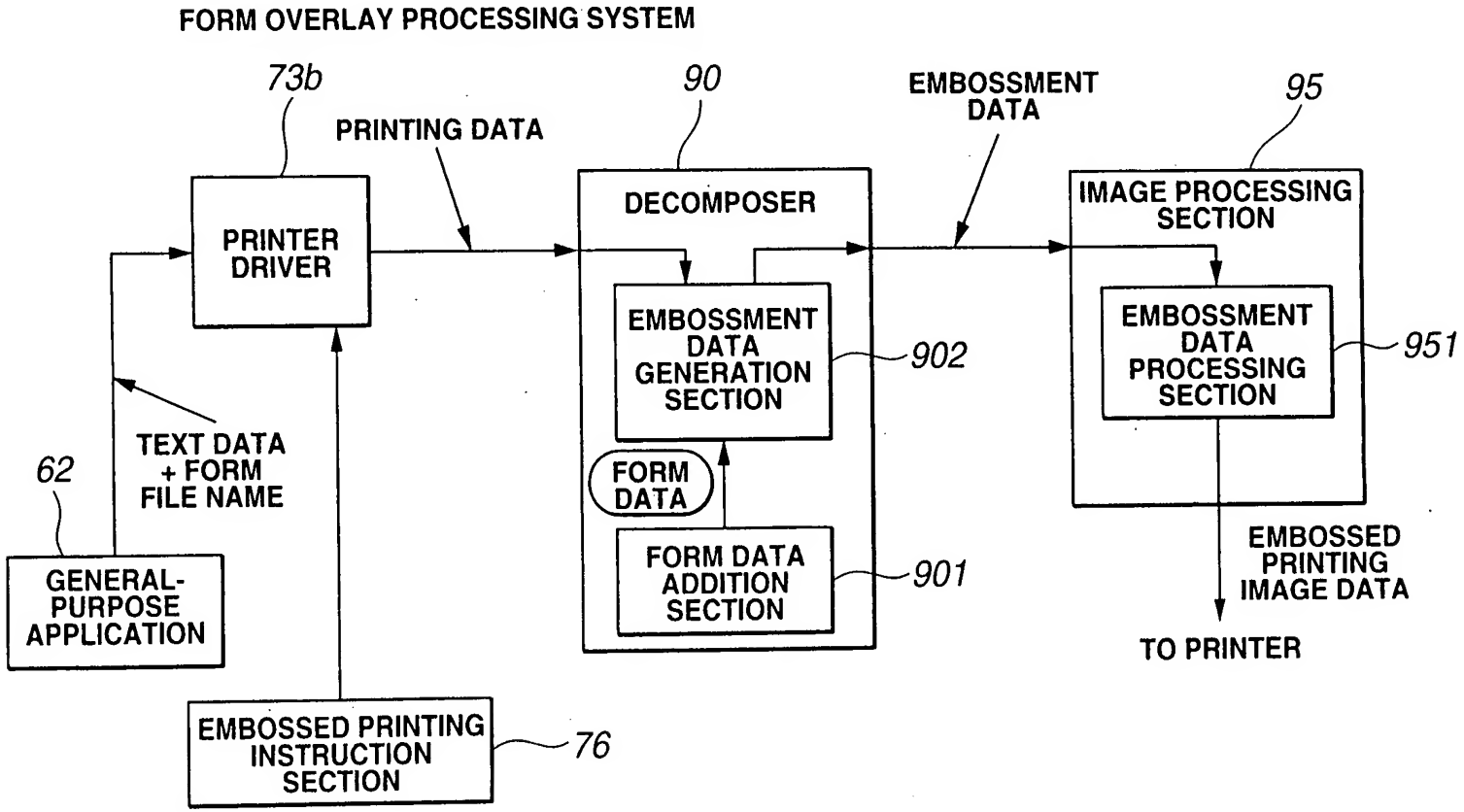
FORM OVERLAY PROCESSING SYSTEM
73b
PRINTING DATA
90
EMBOSSMENT DATA
95
PRINTER DRIVER
DECOMPOSER
IMAGE PROCESSING SECTION
EMBOSSMENT DATA GENERATION SECTION
902
EMBOSSMENT DATA PROCESSING SECTION
951
TEXT DATA + FORM FILE NAME
62
FORM DATA
FORM DATA ADDITION SECTION
901
EMBOSSED PRINTING IMAGE DATA
GENERAL-PURPOSE APPLICATION
TO PRINTER
EMBOSSED PRINTING INSTRUCTION SECTION
76

FIG.43

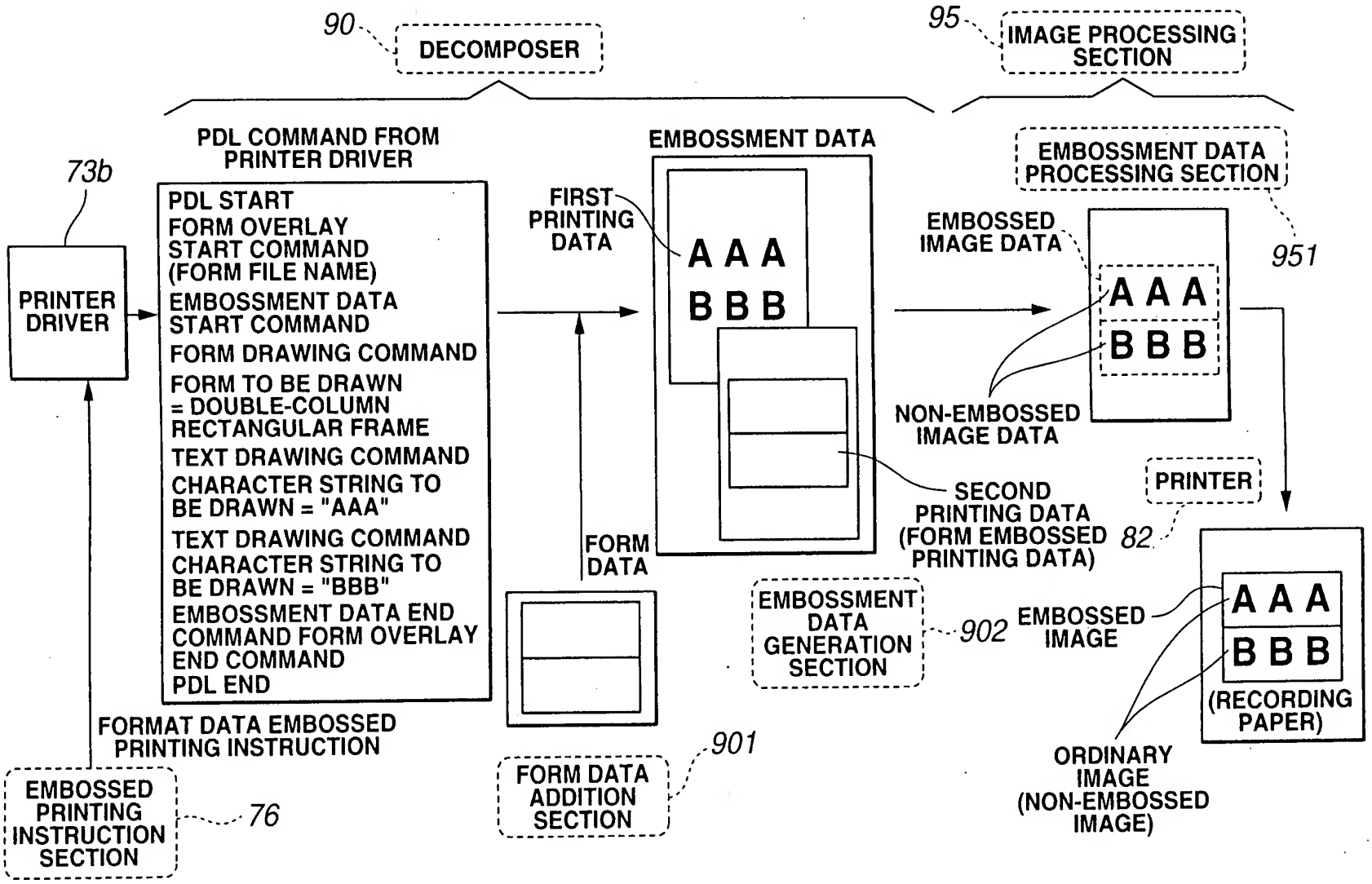
90
DECOMPOSER
95
IMAGE PROCESSING SECTION
PDL COMMAND FROM PRINTER DRIVER
EMBOSSMENT DATA
EMBOSSMENT DATA PROCESSING SECTION
951
73b
PRINTER DRIVER
PDL START
FORM OVERLAY START COMMAND (FORM FILE NAME)
EMBOSSMENT DATA START COMMAND
FORM DRAWING COMMAND
FORM TO BE DRAWN = DOUBLE-COLUMN RECTANGULAR FRAME
TEXT DRAWING COMMAND
CHARACTER STRING TO BE DRAWN = "AAA"
TEXT DRAWING COMMAND
CHARACTER STRING TO BE DRAWN = "BBB"
EMBOSSMENT DATA END COMMAND FORM OVERLAY END COMMAND
PDL END
FIRST PRINTING DATA
A A A
B B B
EMBOSSED IMAGE DATA
NON-EMBOSSED IMAGE DATA
SECOND PRINTING DATA (FORM EMBOSSED PRINTING DATA)
PRINTER
82
FORM DATA
EMBOSSMENT DATA GENERATION SECTION
902
EMBOSSED IMAGE
(RECORDING PAPER)
FORMAT DATA EMBOSSED PRINTING INSTRUCTION
EMBOSSED PRINTING INSTRUCTION SECTION
76
FORM DATA ADDITION SECTION
901
ORDINARY IMAGE (NON-EMBOSSED IMAGE)

FIG.44
(PRIOR ART)

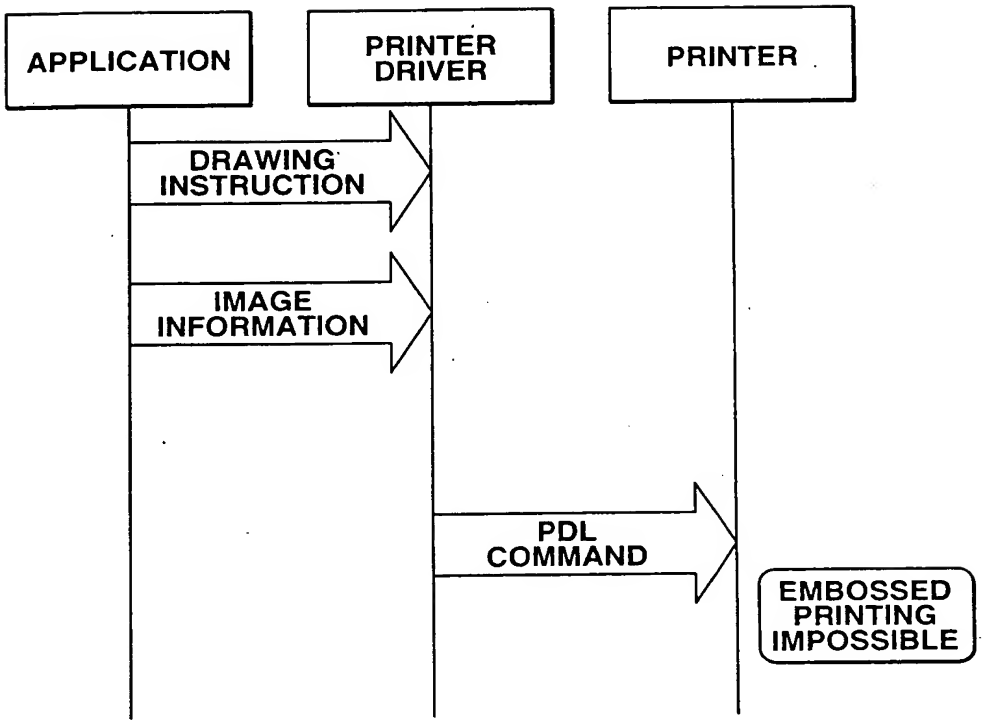

FIG.45
(PRIOR ART)

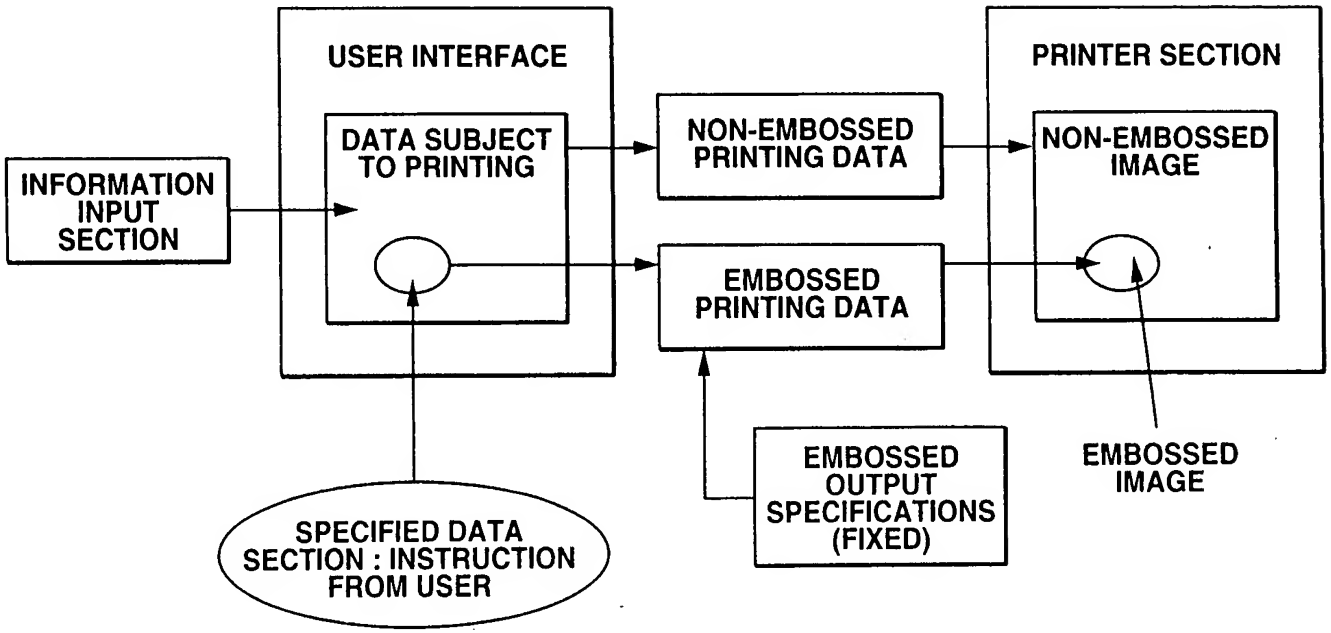
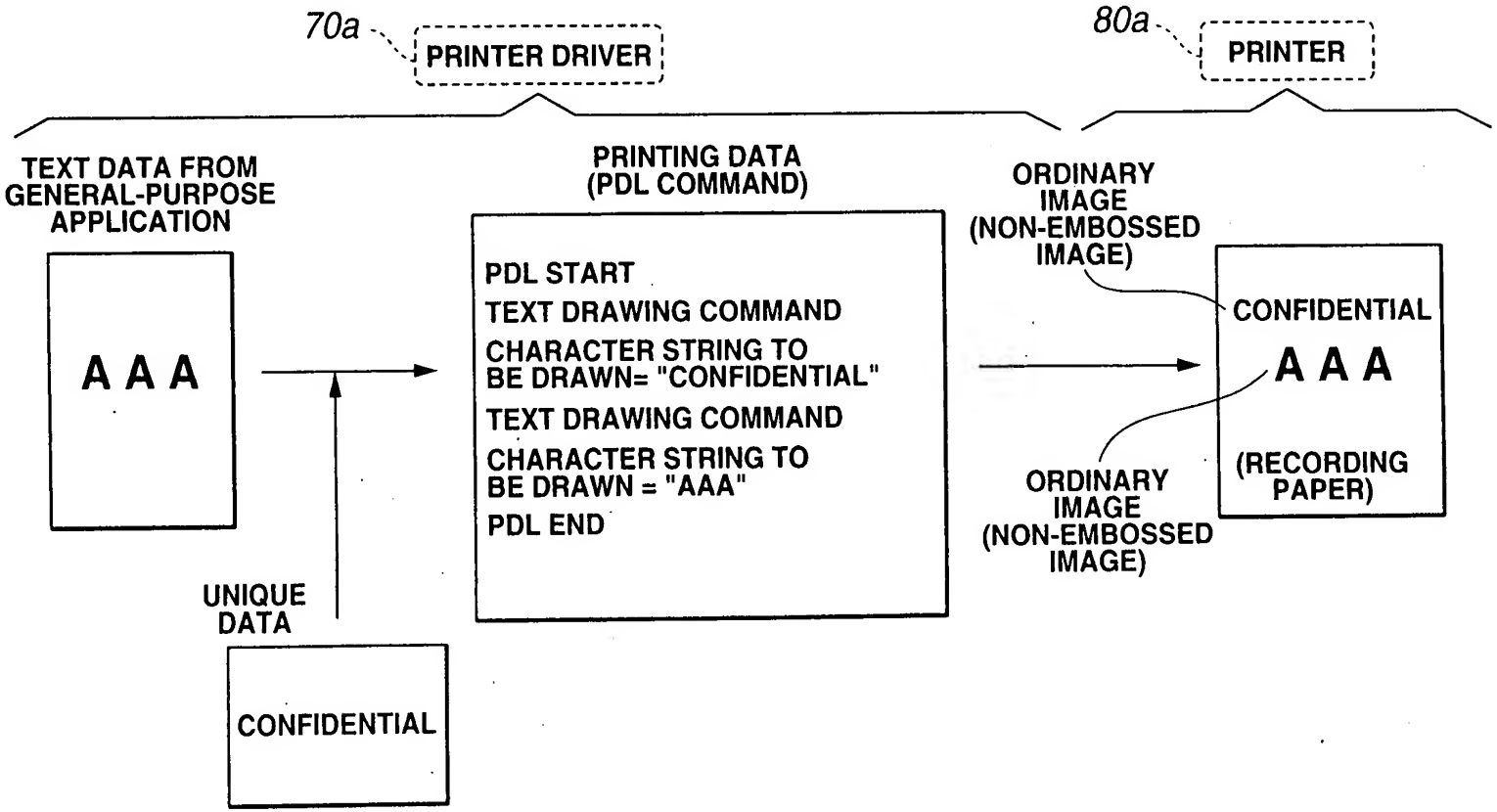
FIG.46
(PRIOR ART)